Measuring:

- Ammonia
- ATP (Adenosine Triphosphate)
- Bacterial Measurement in Wastewater
- BTX
- Chloramine (Monochloramine)
- Chlorine/Free Chlorine
- COD/BOD/TOC/DOC/SAC
- Colour/Hazen
- Conductivity
- Dissolved Oxygen
- Dry Solids Measurements
- E. Coli / Total Coliforms
- Greenhouse Gas (N_2O)
- Hydrocarbons
- Level
- Manganese
- Microbes in Wastewater
- Nitrate/Nitrite
- Oil/Grease in Water
- Ortho-Phosphate
- pH/ORP (Redox)
- Sulphite
- Sludge Blanket
- Suspended Solids
- TDS
- Total Nitrogen
- Total Phosphorus
- Turbidity

Royce Water Technologies

Product Catalogue

2026

Innovative Technologies:

- Methane Potential Analysis Systems for Biomass
- Sonication - Denitrification Improvement
- Sonication - Anaerobic Digestion Improvement
- Sonication - Reduction of Foaming in Activated Sludge Basins
- Wastewater Sludge Dewatering Optimisation

www.roycewater.com.au

Company Background

After 20 years of service in the Australian water and wastewater marketplace, Royce Water Technologies has established an envied position as a quality supplier of innovative solutions.

We take great pride in offering only the best available solutions in analytical monitoring, control and process improvement in Australia's diverse water and wastewater industry.

Royce Water Technologies has a nationwide team of dedicated water and wastewater professionals. Our team services Queensland, New South Wales and Victoria. We have an expert team of partner distributors covering Tasmania, South Australia, Western Australia and New Zealand.

"Our aim is to provide accurate & reliable measurements of process parameters with the lowest overall cost of ownership - which leads to improved process quality & reduced energy consumption."

We are backed by industry expertise from across the globe in our ongoing relationships with the most innovative manufacturers and commitment to professional development. Royce Water Technologies is able to deliver the best possible expert advice and solutions to our clients throughout Australia.

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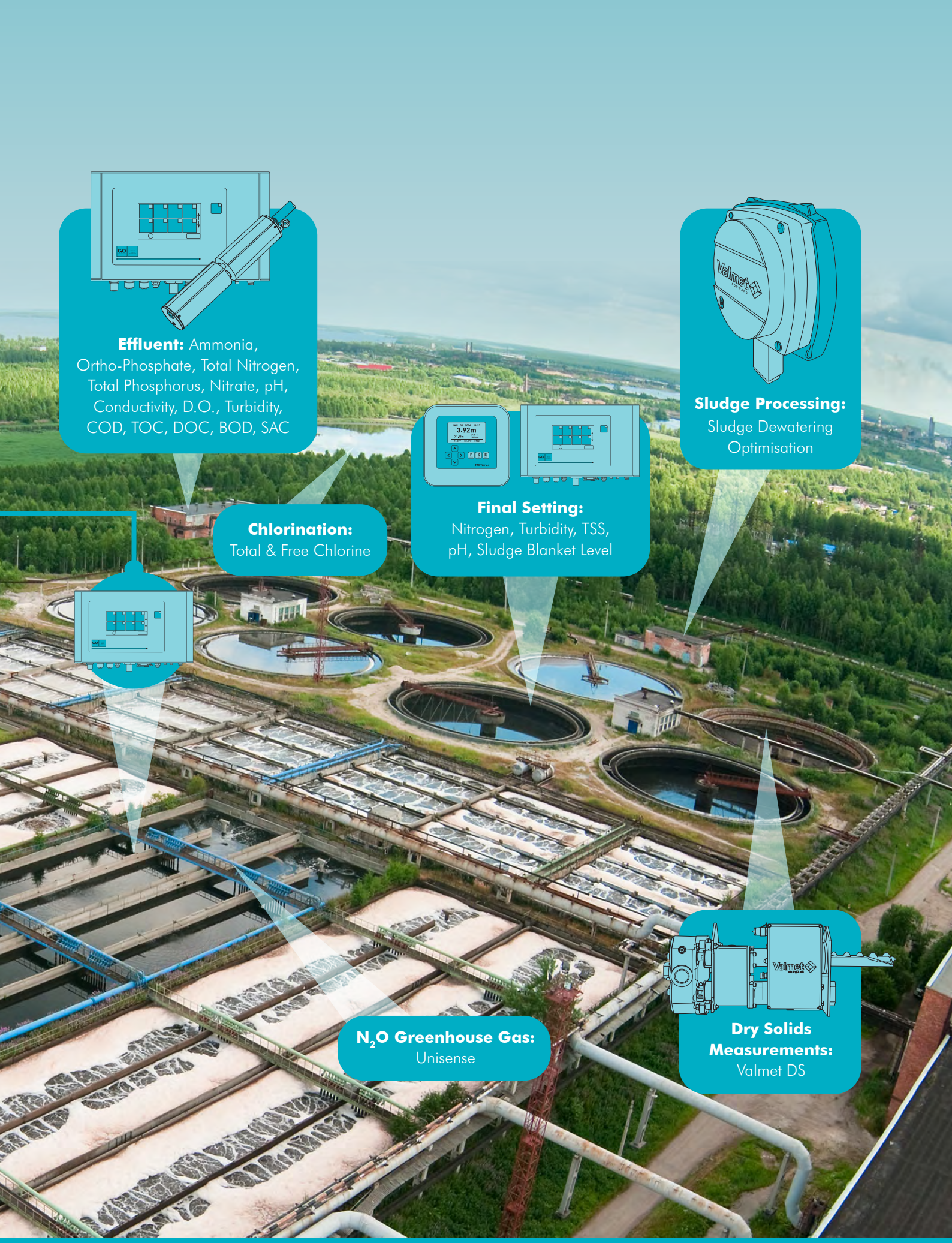
** Please do not rely on the information contained in this Product Catalogue as specifications are constantly changing. Please contact your local Royce Water Technologies office for the most up-to-date specifications.

Waste Water Treatment Plant Process Monitoring & Control


Effluent: Ammonia, Ortho-Phosphate, Total Nitrogen, Total Phosphorus, Nitrate, pH, Conductivity, D.O., Turbidity, COD, TOC, DOC, BOD, SAC
Chlorination: Total & Free Chlorine
Final Setting: Nitrogen, Turbidity, TSS, pH, Sludge Blanket Level
Sludge Processing: Sludge Dewatering Optimisation
N_2O Greenhouse Gas: Unisense
Dry Solids Measurements: Valmet DS

MXD 73/75

Multi-function Analyser

Measuring: Temperature / pH / ORP(Redox) / Conductivity / Salinity / TDS / Dissolved Oxygen / Turbidity / Suspended Solids (TSS)

The innovative MXD70 series of process instruments brings a new dimension to analytical process measurements with the modular design to meet ever changing process requirements.

- MXD73 Compact 96 DIN IP66 Panel mount option
- MXD75 IP66 Surface / Pipe mount version
- 3³/⁴" QVGA Backlit LCD display provides clear indication as single or multiple measurements
- Parameters include: Contacting and Electrodeless Conductivity, pH / Redox or Dissolved Oxygen measurement, Salinity/ TDS/Turbidity/TSS
- Up to 3 measured parameters with temperature readings can be displayed together
- Accurate at zero DO
- User selectable bar graph display option
- Plug and play card detection for simple measurement and output expansion upgrades
- SD card interface allows trouble free saving of configuration and simplifies software updates
- Base models include 2 relay outputs and a single isolated 4-20mA current output
- Can be expanded up to 6 relay outputs and 6 isolated 4-20mA current outputs
- Relays are fully configurable including on/off, time or pulse proportional operation
- 8 Independent programmable digital inputs with user selectable operations
- Dedicated error page provides up to date controller status
- 85-265v or 18-32v Supply options (AC or DC)
- SD Card data logging
- Three separate live trend screens
- Add to existing MXD70 series controllers

MXD70 Series

	MXD73	MXD75
Input Expansion Slots	3 slots, user configurable with any combination of available input add-in cards.	3 slots, user configurable with any combination of available input add-in cards.
Output Expansion Slots	1 slot, user configurable with an additional output option add-in card.	1 slot, user configurable with an additional output option add-in card.
Operating Temperature	-20°C to +50°C	-20°C to +50°C
Current Output Adjustment	±0.01mA, 3 point 0/4-20 mA for remote monitor calibration.	±0.01mA, 3 point 0/4-20 mA for remote monitor calibration.
Buttons	3¾" QVGA back lit LCD module.	3¾" QVGA back lit LCD module.
SD Card Interface	Enables backing up and restoring of instrument configuration, logging of the sensor readings and instrument status (optional extra) and on-site upgrading of instrument software. SD, SDHC and SDXC-FAT32 cards supported	Enables backing up and restoring of instrument configuration, logging of the sensor readings and instrument status (optional extra) and on-site upgrading of instrument software. SD, SDHC and SDXC-FAT32 cards supported
Low Voltage Directive	2006/95/EC using BS EN 61010-1: 2010	2006/95/EC using BS EN 61010-1: 2010
Instrument Housing	UL 94-V0 PC/ABS	UL 94-V0 PC/ABS
Weight	880g	2.7kg
Dimensions	Front - 128 x 116 x 23 mm (H, W, D) Rear - 89 x 89 x 161 mm (H, W, D)	331 x 242 x 110 mm (H, W, D)

Hundreds of installations in Australia!

MXD70 Series - SD Card Data Logging with Live Trending

The Data logging additional software function expands the capabilities of the MXD70 series by allowing the user to record over time the status of the instrument. It consists of two separate sections, Live Trending and SD Card Data Logging, which together help the user to analyse and improve the performance of their application.

The MXD70 series features optional software functions which when purchased will expand the instrument's capabilities. These functions by default are locked. They can be unlocked by LTH or your local distributor at the time of order. Alternatively the functions may be ordered after purchase by supplying LTH or your local distributor the serial number of your instrument. In return they will supply you with an 8 digit unlock code that is unique to the instrument and the required function to be unlocked.

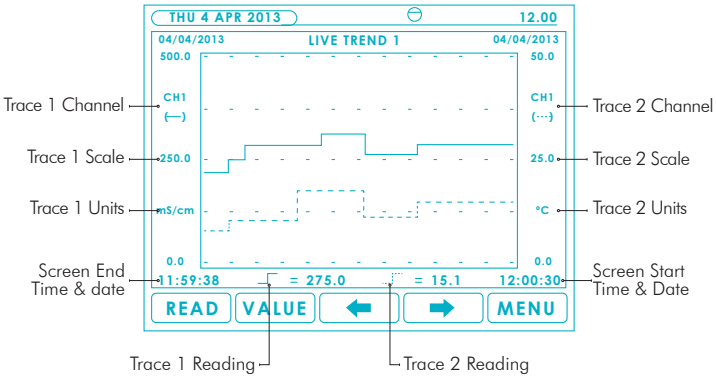
Live Trending provides the user with three separate live trend screens adjacent to the front screen with each showing two readings. This enables the user to instantly view the last 50 samples of each reading. The live trend screen also features a review mode where by the user can further analyse the last 200 samples of each reading, If the user finds something of note the software provides the facility to save these 200 readings to an excel compatible file on the SD card.

Further analysis is provided by optionally displaying the minimum, maximum and average value of the 200 samples. The number of readings, the source of the readings, the displayed scale and the sample interval rate are all configurable by the user.

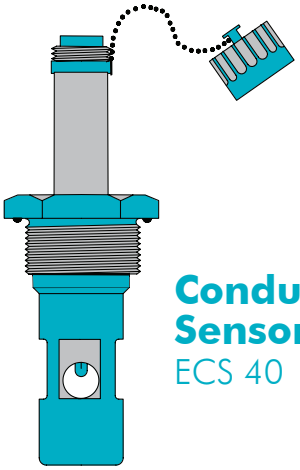
The SD Card Data Logging enables the user to log over long periods the status of the instrument. Variables logged include: the primary sensor readings, any secondary readings, set point status, the current output readings, digital input status and any error messages. This data can be viewed either on the MXD70 series instrument or removed and viewed in Microsoft Excel on a PC. The user can configure which channels are logged and the logging interval. When logging three inputs at one sample per second a 1GB card will allow 40 days of recording.

Once removed place the SD card in a card reader connected to the PC. Open the SD card in the file explorer and browse to either the Data logging folder to view the SD card data logging or the Live Trend folder to view the live trend log saves.

Each file is limited to 65535 logs; when this limit is reached the instrument will automatically create a new file. The instrument will also automatically create a new file if the configuration of the instrument is changed whilst the data logging is active. Each file name contains the date and time of when it was created. The data is stored as a comma separated variable (csv), which can be read by Microsoft Excel.

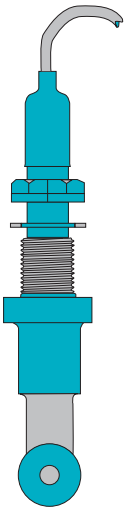


Sensors for MXD & BXD

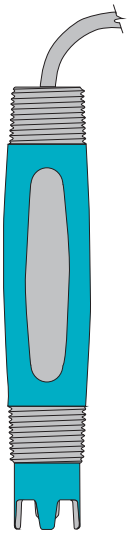


Conductivity Sensor
ECS 40

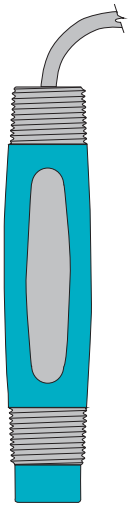
Galvanic Dissolved Oxygen Sensor
RWT G95A



Conductivity Sensor
ECS 20

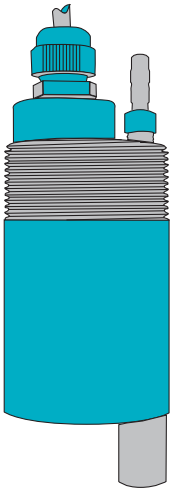


ORP Sensor
S 400

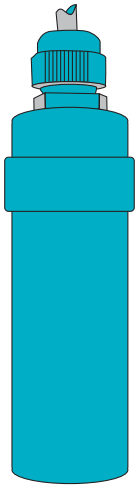


pH Sensor
S 410

Optical Dissolved Oxygen Sensor
RWT O95A

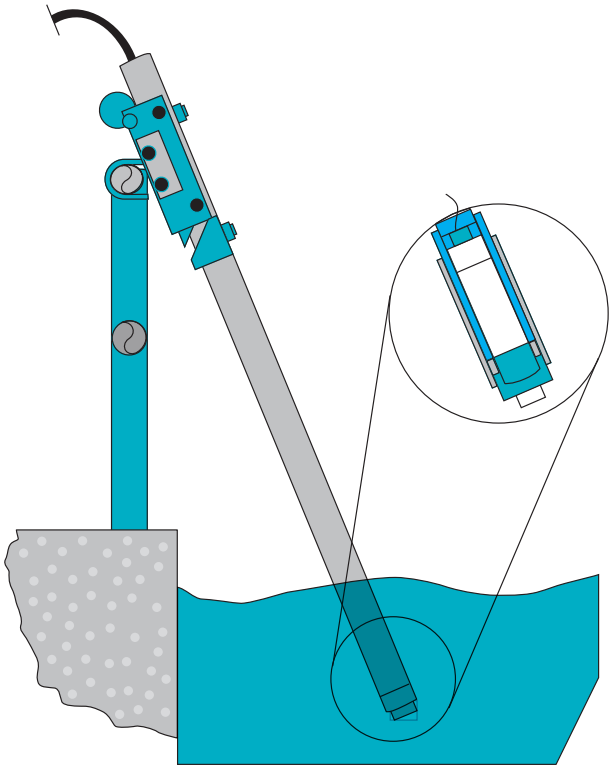


Turbidity/ TSS (MLSS)
TU 8355
TU 8555

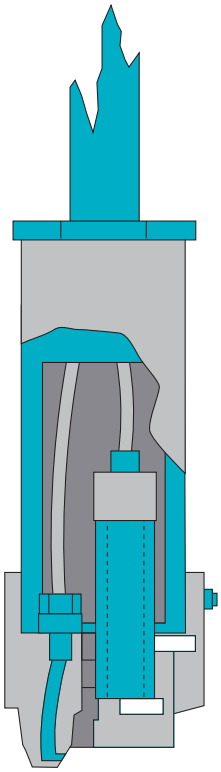


Turbidity
TU 8325
TU 8525

Sensor Mountings & Enclosures



Handrail Bracket



Jethead

Marine Grade Aluminium Enclosure

BXD17

Single Input Controller

Measuring: pH / ORP(Redox) / Conductivity / Salinity / TDS / Dissolved Oxygen / Total Suspended Solids (MLSS) / Turbidity Transmitter

The BXD17 is a microprocessor controlled instrument range offering individual controllers for the measurement parameters Electrodeless (Inductive) and Contact Conductivity, pH/Redox and Dissolved Oxygen. To achieve this the instrument utilises a clear multifunction LCD to display the primary reading and temperature, show operational status and to provide an intuitive user interface.

As standard the instrument is simple to install with a new custom 144x144mm IP66 rated Wall-mount instrument, however with the addition of a suitable mounting kit it can either be installed as a Panel-mount or Pipe-mount instrument.

The instrument has two onboard volt-free normally open-relays with adjustable setpoint value and hysteresis. Either one can be set to activate on a High, Low or Band operation allowing the instrument to be used in a variety of dosing and or control applications. Additional setpoint functions include delayed activation and dose alarm timer, whilst the status of the relays can be seen via the main screen of the instrument. The set points relays may also be given the function as a clean initiator to provide automatic sensor cleaning, the clean duration, recovery time and interval period all programmable.

Additionally, the instrument features one industry standard, isolated, 0/4-20mA current output that features adjustable scaling and selectable on-error states, allowing the instrument to transmit the primary reading for remote monitoring purposes. Also fitted are two digital inputs operating on either closed or open contact which allow the instrument to be triggered by No Flow, Low Tank Level, Interlock or Off-line functions that forces the relays to deactivate and the current output to a pre-defined state.

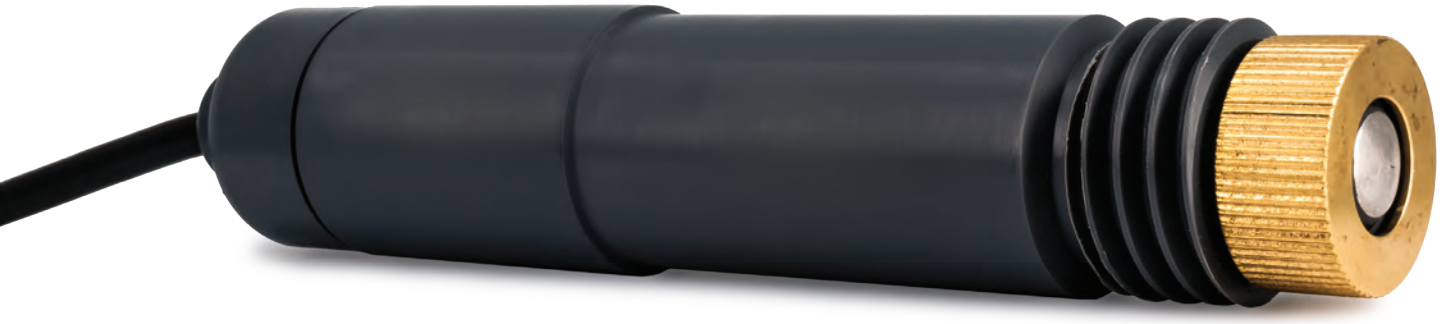
Depending upon version purchased the instrument may be powered by either 85-265V AC or 12-30V DC.

Features

- Power supply 85-265vAC (24vDC option)
- 2 off Independent digital inputs
- Accurate at zero DO
- Measurement and Temperature input
- 2 off Programmable relay outputs
- 2 off Isolated scaleable 0/4-20mA output
- Software Upgrade via Micro(SD) Card
- Available for Galvanic Dissolved Oxygen (BGD17) and pH (BPD17)

Technical specifications

Enclosure	**Front panel:** 144 x 144mm **Panel cut out:** 138 x 138mm **Depth behind panel:** 77mm maximum
Cable Glands/Connectors	Maximum of 5, 2 x M20, 3 x M16
Material	ABS – Coloured Pantone 281C
Protection	IP66 using BS EN 60529: 1992
Equipment Safety	2006/95/EC using BS EN 61010-1: 2010
Ambient temperature	-20 +55°C Relative Humidity 5 to 95%, non-condensing.
Power Supply	85-265v, maximum 15 Watts. Low voltage option available – 12-30vDC
Modes	High, Low, Band, Delay, Hysteresis, Dose Alarm, Initial Charge



RWT G95A

Galvanic Dissolved Oxygen Sensor

The Australian made RWT G95A is the next generation in Dissolved Oxygen measurement. We have taken a sensor that was already good and made it better. Galvanic Dissolved Oxygen Sensor are part of Australia's most proven range of Dissolved Oxygen Systems with excellent measurement at the low end of the measurement range at zero. They are the preferred choice at many wastewater treatment authorities.

The Model RWT G95A Sensor utilises proven galvanic sensing technology – without a question the most accurate and reliable Dissolved Oxygen sensing technology ever developed. The pure platinum cathode makes the sensor incapable of being poisoned by other gases often found in impure waters, such as hydrogen sulfide.

This sensor utilises the only DO sensing technology that is successful in continuous de-nitrification monitoring and control applications. It is also the only sensor design that can be used continuously in very violent pure liquid oxygen injection systems.

Features

- Accurate at zero DO
- Ground loop elimination
- Platinum cathode, lead anode
- Automatic temperature compensation
- Easily refurbished in the field
- Jet-cleaning available
- No special tools required

This sensor can be used with MXD73/75 Analyser on page 6 and BXD17 Analyser on page 10

Technical specifications

Measuring Type	Galvanic
Cathode Material	99.5% Platinum
Anode Material	Lead Plate
Range	0-20mg/L
Accuracy	≤ ±0.2 mg/L or ±2% of reading (whichever is greater)
Electrolyte	Potassium Chloride gel
Repeatability	± 1% (at constant temperature)
Temperature Range	0°C to 50°C
Depth Rating	≥ 5m (0.5 bar)
Response time	Using 1 mil membrane - PPM 99% of actual, from air calibration < 30 seconds
Temperature accuracy	± 0.2°C

NOW WITH DISPOSABLE CARTRIDGE

RWT O95A

Fluorescence Dissolved Oxygen Sensor

The RWT O95A is the latest development in Dissolved Oxygen technology, where engineers prefer fluorescent dissolved oxygen measurement. We have redesigned a fluorescent Sensor to be compatible with existing Royce Water Technologies assemblies and mounting systems.

The RWT O95A is a SMART optical dissolved oxygen (DO) sensor for use in water and wastewater applications. It combines high reliability with low maintenance and a standard 12 x 120 mm design.

Features

- Compatible with Royce Jet Head
- Can be calibrated at zero DO
- Automatic temperature compensation
- Easily refurbished in the field
- No special tools required
- No Electrolyte requirement
- No Flow requirement
- No oxygen consumption
- Plug-and-Play with SMART calibration
- Retains calibration history
- Retains user metadata for tracking

Technical specifications

Operating Range	0 – 300% SAT (0 – 30 PPM) 5°– 50° C 0 – 5 bar
Accuracy	Within 1% full range (%SAT or PPM)
Digital Output	Process Variable: 0 – 300 % SAT (0 – 30 PPM) Temperature Compensated Phase Angle: Range 10°–100° PA Operational Temp: 5°– 50° C Amplitude (diagnostic for Sensing Surface Health)
Response Time	T98 < 15 seconds @37° C; N2 to AIR T98 < 15 seconds @37°C; AIR to N2
Wetted Materials	Sensor Body and Cap: Anodized Aluminium O-rings: EPDM Sensing Surface: PES and Silicone Rubber
Termination	Fixed cable standard 10M length
Power Supply	5.0 VDC supplied by Power Module or Transmitter
Design Features	Easily Replaced Optical Cap Rugged PCV Coated Cable w/ Ferrules

Note: Temperature, pressure and solution composition will influence the life expectancy of the measurement sensor.

This sensor can be used with MXD73/75 Analyser on page 6 and BXD17 Analyser on page 10

OD 8325/8525

Fluorescence Dissolved Oxygen Sensors

These sensors are designed for measuring dissolved oxygen using the fluorescence phenomenon. OD 8325 sensor is for submersible installation. OD 8525 sensor is for overflow and in-line installation. Thanks to the analog and digital outputs, the sensors can be connected to the most common PLC's or data acquisition boards. B&C Electronics offers MC 6587 and MC 7687 multi-channel controllers that allow complete management of up to three sensors, displaying the measurements and the messages that guide calibration and configuration.

Measuring method:

A light pulse of a specific wavelength and a special substance is deposited on a transparent layer in contact with the liquid (or air). The light energy is absorbed and partially re-emitted in the form of a light pulse at a longer wavelength. This phenomenon is called fluorescence. The oxygen molecules in contact with the sensitive layer attenuate the fluorescence (quenching) in relations to their concentration. The digital processing of the fluorescence allows the measurement of oxygen concentration. The measuring method does not require electrolytes.

OD 8325

TU 910

OD 8525

Technical Specifications

Ranges	0/200.0 % air saturation – 0/20.00 ppm
Scalability factor 4/20 mA	10/150 %
Resolution	0.1 % sat. – 0.01 ppm
Power supply	9/36 VDC
Accuracy	± 1.0 % sat. < 10.0 % sat. ± 2.0 % sat. > 10.0 % sat.
Repeatability	± 0.5 % of the scale
Drift	< 1 % year
Response time	95 % < 60 seconds
Load	600 Ohm max. a 24 Vdc
Digital output	RS 485 isolated
Protocols	0/50 °C
Dual filter software	2/220 seconds
Current loop	4/20 mA isolated
Protocols	B&C ASCII e Modbus RTU (03, 06, 16 functions)
Baud rate	2400 / 4800 / 9600 / 19200 baud
Probes ID	01/99 (B&C protocol) 01/243 (Modbus protocol)
Probes network	32 max.
Operating temperature	60 °C max.
Operating pressure	6 bar at 25 °C (OD 8525) 1 bar at 25 °C (OD 8325)
Dimensions OD 8525	L=143 mm, D=40 mm
Dimensions OD 8325	L=165 mm, D=60 mm
Weight OD 8525	Body 160 g, cable 640 g
Weight OD 8325	Body 420 g, cable 640 g
Body	PVC-C
Cable	10 m (100 m max.), PVC sheath
Protection	IP 68

LTH Electronics

S400 Series

pH and redox sensors for the process industries

The S400 sensors have been designed for rugged service in submersion or inline process applications. The reference cell features a double junction design for extended service life in harsh applications. The high quality sensors are constructed of corrosion resistant wetted materials including Ryton®, Teflon® and glass. They can be supplied with built in temperature compensation and a solution ground connection.

Sensor Tip Options

Coaxial Teflon Reference

Designed to withstand tough industrial applications. Best overall performance with rugged dome bulb.

Flat pH Bulb Self Cleaning

Designed for obstructionless contact with the sample stream for self cleaning service and for use with a spraywash system. Features coaxial porous teflon junction.

Dual Ceramic Pin Junction

For use in highly alkaline processes. Best choice for use at high pressures.

Features

- Choice of body styles
- Can be used with virtually any pH meter
- Competitive price
- Choice of temperature compensators
- Optional built in solution ground
- Sealed double junction reference
- 0.75" or 1" Male NPT threaded connection
- Wide range of mounting options
- Moulded from chemical resistant Ryton®

Technical specifications

pH range	0 - 14 pH
Redox range	± 5000 mV
Temperature range	0 - 105°C
Maximum pressure	10 bar at 100°C
Glass	HT-3 standard, HT-4 high pH available (above 13 pH)
Temperature sensor	Standard Pt1000*
Wetted materials pH	Ryton, PTFE or ceramic & glass
Wetted materials	Redox Ryton, PTFE or ceramic & platinum
Standard cable length	6 metres with ferrule connections*

Note:Temperature, pressure & solution composition will influence the life expectancy of the measurement sensor.

*Other variants available. Please contact our sales department for details.

This sensor can be used with MXD73/75 Analyser on page 6 and BXD17 Analyser on page 10

PH 3436

pH / ORP transmitter 4-20 mA and RS485

The transmitter can be configured for the measurement of pH or ORP and it can also work with the antimony pH electrodes. The measured values, along with support and instruction messages, are also visualized on an alphanumeric display. The transmitter displays the temperature value measured by a Pt100 and performs the manual/automatic compensation (pH only). The extractable terminal blocks and DIN rail mounting make easy the maintenance and the installation in the field.

Main Features

- 4-20 mA isolated 2-wire current loop
- RS485 isolated interface
- B&C and Modbus protocols
- Alphanumeric LCD 8x1 characters
- pH or ORP measurement
- Manual/automatic temperature compensation °C or °F temperature display
- Digital input with hold function Recognition of the standard solution Password at two levels
- Last calibration date
- Totalization of operating hours Power 9/36 Vcc
- Extractable terminal block DIN rail enclosure

Analog Mode

The transmitter can be connected to a PLC or instruments BC 7335 - BC 7635 - BC 7635.010 or BC 7687 - BC 6587 which provide the Vdc power supply, measuring values, two set point and the alarm. The digital input can place the current loop on hold.

Digital Mode

When in digital mode, the transmitter is a slave device interrogated by a master device with protocol B&C (ASCII) or Modbus (function 03).

Technical Specifications

Display	alphanumeric LCD 8x1 characters
Inputs	pH electrode (glass/ref) pH electrode (antimony/ref) ORP electrode (Pt/rif o Au/rif) digital input (free voltage contact)
pH scale	0/14.00 pH
ORP scales	0/1000 0/-1000 -1000/1000/0/2000 0/-2000 mV
Temperature scales	-10.0/110.0 °C, 14.0/230.0 °F
Temperature compensation	manual/automatic (pH)
Zero	± 2 pH, ± 100 mV
Sensitivity	80/110 % (glass and ORP electrodes)
Sensitivity	70/140 % (antimony electrode)
Zero temperature	± 5.0 °C, ± 9.0 °F
Input current	< 2 pA
Input resistance	> 1012 ohm
Analog output	4-20 mA two wires isolated
Digital output	RS485 isolated
B&C ID protocol	01 - 32
Modbus address	0 - 243
Ambient temperature	0/50 °C
Humidity	95% without condensation
Power supply	9/36 Vcc
Consumption	< 4 mA with loop disabled
Isolation	500 Vdc input/output
Enclosure	DIN rail in polycarbonate
Terminal blocks	extractable
Weight	250 g
Dimensions	71 x 95 x 58 mm (4 DIN rail modules)
EMC/RFI conformity	EN 61326
Registered design	002564666-001

LTH Electronics

DXU Series

Measuring: Temperature / pH / ORP(Redox) / Conductivity / Salinity / TDS / Dissolved Oxygen / Turbidity / Suspended Solids (TSS)

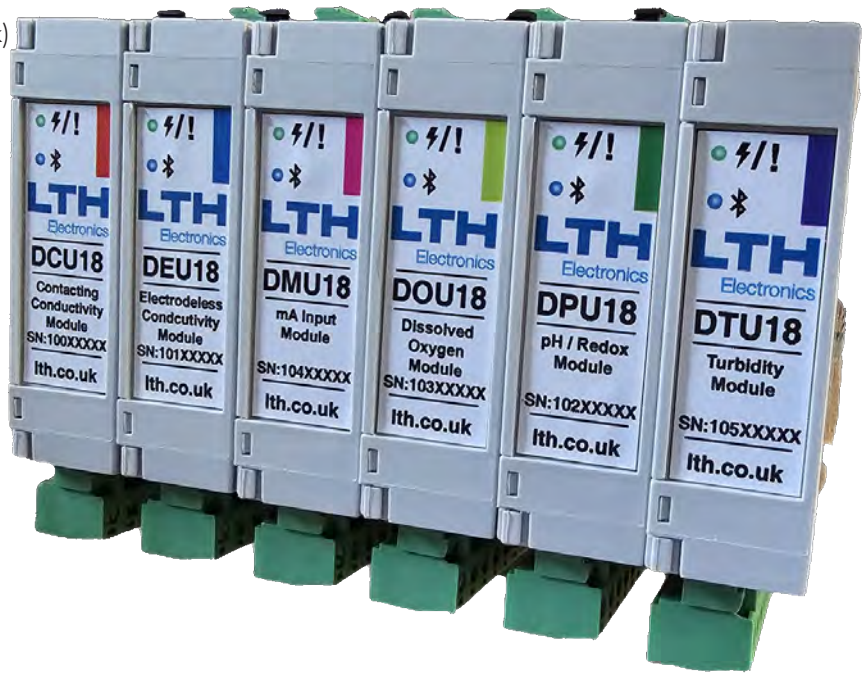
The new range of DXU18 transmitters will be a 4-wire series of blind DIN-Rail mounting analytical transmitters, to meet the need from system builders for compact devices that may be incorporated into their own builds. All devices have Bluetooth connectivity directly to IOS or Android devices for programming and calibrating requirements.

Measurement:

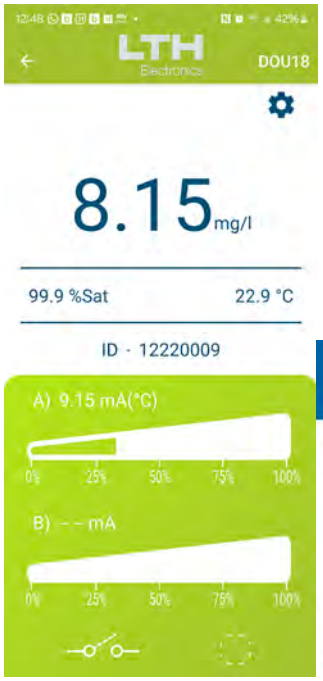
- Contacting Conductivity
- Electrodeless(Inductive) Conductivity
- pH and Redox (ORP)
- Dissolved Oxygen
- Turbidity
- Current (0/4-20 mA) Input
- Modbus RS485 Input Option

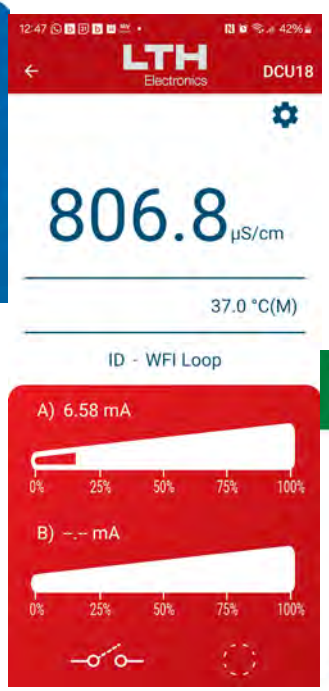
Features:

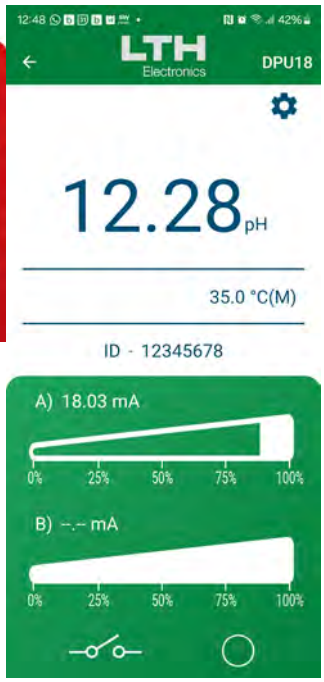
- 12-30VDC Supply
- 1x 0/4-20mA Output (Main Measurement)
- 1x 0/4-20mA Output (Temperature)
- 1x Digital Input (Volt Free)
- 1x Solid State Relay Output
- Mod bus RS485 (optional un-lock)
- Modbus Ethernet (optional un-lock)
- Bluetooth Connectivity



LTH Electronics







ECS-20 Series

Low Cost Electrodeless Conductivity Sensors

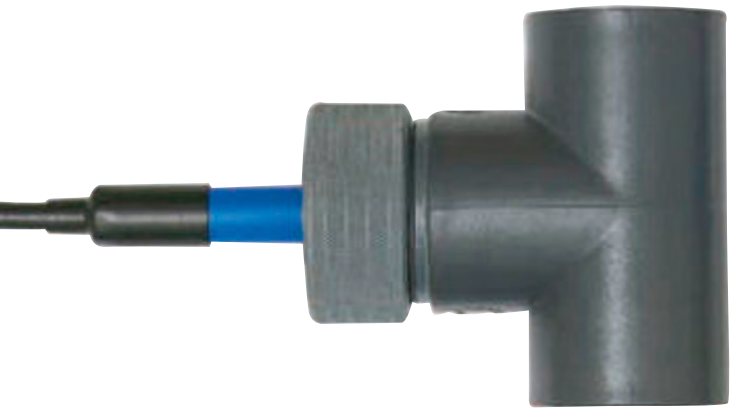
The ECS20 Series of Electrodeless conductivity sensors have been developed and engineered to produce a very low cost sensor, without sacrificing performance or quality. This has been achieved by injection moulding the sensor in glass loaded polypropylene.

The sensor provides all of the benefits that the method of Electrodeless conductivity measurement provides. It is extremely tolerant of coating on the sensor, probably the greatest problem with conventional conductivity measurement.

The ECS20T incorporates temperature compensation and can be mounted inline, in a tank wall or large bore pipe or in an open tank using a range of adapters.

Features

- Low cost
- Low maintenance
- Inline, Dip and Tank Mounting Options
- Ideal for use with the BC9 series Controllers and the MTD53 Cooling Tower Monitor
- Ideal for Cooling Tower Bleed, Rinse Water & Solution Concentration Applications



Technical Specifications

ECS 20T

Operating temp	-5 to 60°C (not freezing)
Wetted Material	Glass filled polypropylene
Temp Comp	2 wire Pt1000
Cable	Standard 5 metres 54G terminated with tag ends, extended to instrument limit, via junction box
Connection	0.5″ BSP male

ECS 22T Dip Assembly

Material	PVC
Operating Temp	-5 to 60°C (not freezing)
Dip Length	600mm or 1200mm
Mounting	Standard bracket or flange option
Protection	IP68

ECS 24T In-Line Assembly

Material	PVC with Viton seal
Operating Temp	-5 to 60°C (not freezing)
Size	1.5″ plain tee with 0.5″BSP option
Operating Pressure	Vacuum to 6.5 bar (100psi)

ECS 27T Tank Mount/Insertion Assembly

Material	PVC with Viton seal
Operating Temp	-5 to 60°C (not freezing)
Size	1.25″ BSP
Operating Pressure	Vacuum to 6.5 bar (100psi)

This sensor can be used with MXD73/75 Analyser on page 6 and BXD17 Analyser on page 10

LTH
Electronics

ECS-40 Series

Electrodeless Conductivity Sensors

The Electrodeless method of measuring conductivity has many advantages over conventional methods. In particular the sensors will operate with virtually zero maintenance and provide reliable measurements over extended periods of time.

The ECS40 series can be mounted inline, in a tank wall, large bore pipe or in an open tank using a variety of fittings. The option of several different hygienic flanges caters for the majority of applications.

The sensor is manufactured in PEEK™ a food grade material with excellent chemical resistance and high temperature performance. The construction of the sensor allows it to operate at 100°C continuously and withstand thermal shocks, commonly associated with CIP applications and can be steam sterilised up to 135°C.

The sensors are fitted with Pt1000 temperature sensors and are compatible with all LTH Electrodeless conductivity instruments. The temperature sensor is mounted in direct contact with the medium via a stainless steel jacket, an alternative PEEK jacket is available where stainless steel might be unacceptable. Connection is made via an IP67 plug which simplifies installation and maintenance.

Features

- Low maintenance
- Hygenic inline, Dip and Tank Mounting Options
- Ideal for Process, Dairy, Brewing and Food Applications
- Conductivity and Solution Concentration Measurements
- Steam Sterilisable to 135°C, Thermal Shock Resistant
- IP67 Connection Simplifies Installation and Maintenance
- Fast Temperature Response $^{t}90 < 10$ secs

Notes: Flanges for the ECS49 sensors must be ordered separately. Minimum pipe size for insertion sensors 2.5", 63.5 mm. Optional PEEK temperature pocket available. Temperature, pressure and solution composition will influence the life expectancy of the measurement sensor. Varivent® is the registered trademark of Tuchenhagen Gmbh.

This sensor can be used with MXD73/75 Analyser on page 6 and BXD17 Analyser on page 10

Technical Specifications

ECS 42T Dip Sensor

Wetted Material	Peek, 316 stainless steel temperature pocket, 316 stainless steel stem
Order Code	8515 600mm dip 8516 1200mm dip

ECS 49T Hygenic Insertion Sensor

Wetted Material	Peek, 316 stainless steel temperature pocket, 316 stainless steel flange, ordered separately. EPDM seal
Maximum pressure	100 psi (6.5 bar).
Order Code	8527

ECS 43T In-Line Sensor

Wetted Material	Peek, 316 stainless steel temperature pocket, PVC EPDM seal
Maximum pressure	100 psi (6.5 bar)
Maximum Temperature	60 °C (PVC Tee)
Order Code	8523

ECS 45T In-Line Sensor

Wetted Material	Peek, 316 stainless steel temperature pocket and tee. EPDM seal.
Maximum pressure	100 psi (6.5 bar)
Order Code	8525

ECS 47T Insertion Sensor

Wetted Material	Peek, 316 stainless steel temperature pocket and screwed fitting. EPDM seal.
Maximum pressure	150 psi (10 bar)
Order Code	8526

ECS 48T Hygienic Insertion Sensor

Wetted Material	Peek, 316 stainless steel temperature pocket, 316 stainless steel flange, ordered separately. EPDM seal.
Maximum pressure	100 psi (6.5 bar)
Order Code	8528

ST 3254.X - ST 3214.X

Electrodeless 4-20mA Loop Conductivity Sensors

ST 3254.1 0/10 mS range
ST 3254.2 0/100 mS range
ST 3254.3 0/1000 mS range
ST 3214.4 0/20 mS range
ST 3214.5 0/200 mS range
ST 3214.6 0/2000 mS range

On request, a model with range 0/300 mS is available.

This E. Conductivity sensor consists of a loop powered transmitter and an electrodeless conductivity sensor in a single package. Temperature compensation is accomplished with a built-in sensor. Applications include water tratment, cooling tower and water monitoring. Six models are available for specific measuring range.

Principle of operation

When the electrodeless conductivity sensor is immersed in the sample to be measured, a conductive loop is created through the two toroidally wound coils. An alternating current is applied to one of the coils which induces a current in the conductive loop. The second coil is used to measure the conductivity which is proportional to the induced current in the solution. The advantages of the electrodeless method are more apparent in measurement applications in which electrodes contamination and polarization of a conventional conductivity system can lead to erroneous readings.

Each sensor contains:
- two measuring toroidal coils
- temperature sensor
- 4-20 mA current loop amplifier

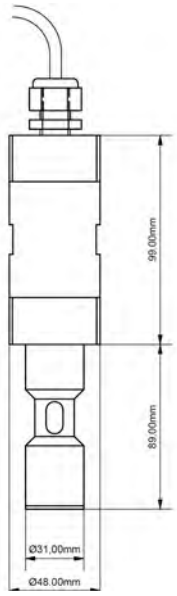
Technical specifications

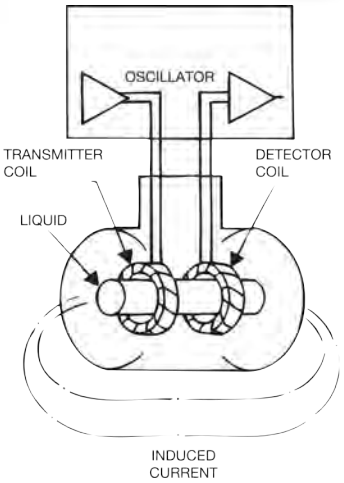
Measuring method	toroidal
Power supply	11/30 Vdc
Temperature sensor	built-in
Load	600 ohm max. at 24 Vdc
Max. temperature	50 °C part in contact with liquid
Temperature coefficient	2.2 %/°C (2.0 for ST 3214.X)
Temperature reference	25 °C (20 °C for ST 3214. X)
Max. pressure	10 bar at 25 °C
Length	207 mm
Thread	1 1/2" MNPT (both sides)
Body	PVC-C
Cable length	3 m
Installation	in-line or submersible

C 8825.4

Electrodeless 4-20 mA Loop Conductivity Sensor with RS485 - Modbus RTU

This sensor measures electrical conductivity and TDS using the inductive method. Thanks to the analog and digital outputs, the sensor can be connected to the most common PLC's or data acquisition boards. MC 6587 and MC 7687 multi-channel controllers allow complete management of up to three sensors, displaying the measurements and the messages that guide calibration and configuration.





Measuring Method

The electodeless conductivity sensor consists of two windings on toroidal coils, placed side by side, embedded in a plastic material and therefore not in contact with the sample. A through hole allows the solution to close an imaginary electrical circuit around them. An alternating voltage is applied to the transmitter coil while a current proportional to the conductivity of the sample is measured on the detector coil. The TDS value is calculated by applying a programmable conversion factor.

Technical Specifications

Conductivity scale	0/4.000-0/40.00-0/400.0 mS e 0/20.00-0/200.0-0.2000 mS
TDS scales	0/2.000-0/20.00-0.200.0 ppt e 0/10.00-0/100.0-0/1000 ppt
TDS/EC factor	0.450/1.000 1/S
Scalability factor 4/20 mA	10/100%
Sensitivity	60/160%
Zero	± 10% of the full-scale
Resolution	1 digit
Temperature limit	-5/+50 °C
Reference temperature	20/25 °C
Temperature coefficient	0.00/3.50 %/ °C
Power supply	9/36 Vdc
Current loop	4/20 mA isolated
Load	600 Ohm max. a 24 Vdc
Digital output	RS 485 isolated
Protocols	B&C ASCII and Modbus RTU (03, 06, 16 functions)
Baud rate	2400 / 4800 / 9600 / 19200 baud
Operating temperature	60 °C
Operating relative humidity	95% without condensation
Operating pressure	10 bar at 25 °C / 5 bar at 50 °C
Dimensions	L = 165 mm, D = 60 mm
Thread/connection	1.5" MNPT
Body	PVC-C
Weight	Body 520 g, cable 640 g
Cable	10 m (100 m max.), PVC sheath
Protection	IP 68
EMC/RFI conformity	EN 61326-2-3/2013 - EN55011/2009

BC 6587 & BC 7687

Universal 4-20mA Input Controllers

These instruments are used when there is a need to add display functions, control, alarm, and / or automatic cleaning of the sensor to a transmitter capable of performing any type of measurement.

These instruments provide

- ABS watertight enclosure, with Polycarbonate front panel
- Measuring display in the selectable range from -9999 to 9999, corresponding to the 0-20 mA or 4-20 mA input
- VDC power to power the 4-20 mA loop of the transmitter
- Automatic measurement control function
- Alarm from the low/high measurement, the set point overtime operation and the logic input
- Programmable dual analog output for recording and acquisition of the measurement values or PID regulation
- Hold / alarm function activated by two external volt free contacts
- Automatic /manual autoclean function

This unit allows a differential measurement, by using two 0-20 mA or 4-20 mA transmitters featuring the same measurement scale.

Turbidity Probes

TU 8355 High Turbidity and Suspended Solids sensor
TU 8325 Turbidity sensor, submersible with autoclean
TU 8555 High Turbidity and Suspended Solids sensor
TU 8525 Turbidity sensor

Dissolved Oxygen Probes

OD 8325 In-line DO sensor
OD 8525 Submersible DO sensor with autoclean

Conductivity Probes

C 8825.4 Conductivity sensor
ST 3254.X - ST 3214.X Conductivity sensors

Aquameta Sensors

CR420-0.5NPU Hydrostatic water level sensor
CR420-x.xVFA Hydrostatic diesel level sensor
CR420-0.5VPU Hydrostatic level sensor for salt and chlorinated water

Technical Specifications

Display	Multi-line graphic
Input from	0-20 or 4-20 mA single or differential
Scale	- 9999 / +9999 with selectable decimal point
Measuring unit	Electable and 4 digit configurable 2 set-point with min/max function, hysteresis and delay time programmable
Analog output	0-20 or 4-20 mA isolated for PID regulation or measure transmission Min/max alarm relay, activate/deactivate function selectable Parameters configuration on two levels with access code selected by the operator Two logic digital input for hold or alarm function, selectable
Power supply	85/264 Vac - 50/60 Hz, 5 VA
Protection	IP 65
Dimensions	256x230x89 mm
Registered design	002564666-002
Options	
091.428	Power supply 9/36 VDC - 24 Vac

MC 6587 & MC 7687

Multi-channel Modbus Controllers for B&C Modbus Sensors

MC 6587 and MC 7687 can control up to three B&C Electronics digital probes and transmitters. If necessary, the user can connect two or three devices of the same kind, so to have a double or triple validation.

The available parameters are:

- Turbidity and suspended solids
- Dissolved oxygen
- Conductivity and TDS

Turbidity Sensors

TU 8355 High Turbidity and Suspended Solids sensor
TU 8325 Turbidity sensor, submersible with autoclean
TU 8555 High Turbidity and Suspended Solids sensor
TU 8525 Turbidity sensor

Dissolved Oxygen Sensors

OD 8325 In-line DO sensor
OD 8525 Submersible DO sensor with autoclean

Conductivity Sensors

C 8825.4 Conductivity sensor

Technical Specifications

Inputs for digital probes	• C 8825.4 • C 8325.5 • C 8520.5 • OD 8325 • OD 8525 • TU 8325 • TU 8355 • TU 8525 • TU 8525.5 • TU 8555 • TU 8555.5
Inputs for transmitters	• C 3436 conductivity/TDS transmitter for 2 or 4-wire cells • CL 3436 free/combined/total/dioxide chlorine, d.ozone transmitter • PH 3436 pH/ORP transmitter
MC 6587 Keyboard	8 keys
MC 7687 Keyboard	4 keys double function
Display	multiline graphic
Dual analog output	0-20 mA / 4-20 mA Rmax 600 Ω
Digital output	isolated RS485. B&C ASCII and Modbus RTU protocols (03 function)
Dual set point HI/ LO	ON/OFF - PID - PFM – PWM, SPST relays
Hysteresis	0 ÷ 10 % of the scale
Delay	0 ÷ 100.0 seconds
Alarm	SPDT relay, 0 ÷ 100.0 seconds delay
Cleaning function	off / autoclean / manual, SPDT relay repetition time 0.1 ÷ 100.0 hours cleaning time 1.0 ÷ 60.0 seconds holding time 0.0 ÷ 20.0 minutes
SPST and SPDT relay contacts	220V - 5 A resistive load
Operating temperature	-10 ÷ 60 °C
Humidity	95% without condensation
Power supply	85 ÷ 264Vac - 50/60 Hz
Low voltage power supply	9 ÷ 36 Vdc, 12 ÷ 24 Vac (option 091.42x)
Terminal blocks	removable
Weight	1360 g (MC 6587) 450 g (MC 7687)
Enclosure	ABS, IP 65 protection (MC 6587) Metallic, IP 65 front panel only (MC 7687)
Dimensions	256x230x89 mm (MC 6587) 98x98x104 mm, 90x90x95 mm panel cutout (MC 7687)
EMC/RFI conformity	EN 61326-2-3/2013 – EN 55011/2009
Ornamental design nbr.	002564666-002 (MC 6587) - 002564666-003 (MC 7687)

TU 8325 & TU 8525

Turbidity Sensors

These unique sensors have been designed to measure Turbidity based on nephelometric method (ISO 7027 - EN 27027). The sensors are available for submersible and in-pipe installations.

The measuring system consists of:

- Infrared light source
- 90 degree scattered light detector
- Detector of the clean lens status
- 2-wire 4/20 mA analog output
- Modbus Output
- Nozzle for the autoclean by external pressured air (TU 8325)

Principle of operation

The Turbidity follows the nephelometric method (ISO 7027 - EN 27027). A light beam is sent to the sample through an optical lens. The 90 degree scattered light by suspended particle is collected by the sensor through a second lens and it is converted in an electric signal proportional to the Turbidity of the sample. The probe uses an infrared light and the measuring is not affected by the color of the sample.

Accessories for TU 8555 / TU 8525

- **TU 910** Overflow cell

Technical Specifications

Turbidity ranges	0/4.000 – 0/40.00 – 0/400.0 NTU
Scalability factor 4/20 mA	10/100 %
Sensitivity	70/130 %
Zero	± 0.400 NTU
Resolution	0.001 FTU
Power supply	9/36 VDC
Accuracy	0.2 % of the full-scale selected
Repeatability	0.1%
Non-linearity	0.1 %
Check signal	0/200.0 %
Load	600 Ohm max. a 24 Vdc
Digital output	RS 485 isolated
Temperature limit	0/50 °C
Dual filter software	2/220 seconds
Current loop	4/20 mA isolated
Protocols	B&C ASCII e Modbus RTU (03, 06, 16 functions)
Baud rate	2400 / 4800 / 9600 / 19200 baud
Probes ID	01/99 (B&C protocol) 01/243 (Modbus protocol)
Probes network	32 max.
Operating temperature	60 °C max.
Operating pressure	6 bar at 25 °C (TU 8525) 1 bar at 25 °C (TU 8325)
Dimensions TU 8525	L=143 mm, D=40 mm
Dimensions TU 8325	L=165 mm, D=60 mm
Weight TU 8525	Body 160 g, cable 640 g
Weight TU 8325	Body 420 g, cable 640 g
Body	PVC-C (TU 8525.5 model in PVDF is available)
Cable	10 m (100 m max.), PVC sheath
Protection	IP 68

TU 8355 & TU 8555

Suspended Solids Sensors

These unique sensors have been designed to measure high Turbidity and Suspended Solids based on back scattering technology. The sensors are available for submersible and in-pipe installations.

The measuring system consists of:

- Infrared light source
- Detector of scattered light by suspended particles
- Detector of the clean lens status
- 2-wire 4/20 mA analog output
- Modbus Output
- Nozzle for the autoclean by external pressured air (TU 8355)

Principle of operation

The Turbidity and suspended solid measurement follows the back scattering method. A light beam is sent in the sample through an optical lens. The back scattered light by suspended particle is collected by the sensor through a second lens, detected and converted in an electric signal proportional to the Turbidity of the sample. The probe uses an infrared light and the measuring is not affected by the colour of the sample.

TU 8355

TU 910

TU 8555

Technical Specifications

Turbidity ranges	0/100.0 – 0/1000 – 0/10000 FTU
TSS/FTU factor	0.010 ÷ 10.000
TSS unit measure	%, ppt, ppm, ppb, g/l, mg/l, µg/l
Scalability factor 4/20 mA	10/100 %
Sensitivity	70/130 %
Zero	± 10 FTU all scales
Resolution	0.001 FTU
Power supply	9/36 VDC
Accuracy	0.2 % of the full-scale selected
Repeatability	0.1%
Non-linearity	0.1 %
Check signal	0/200.0 %
Load	600 Ohm max. a 24 Vdc
Digital output	RS 485 isolated
Temperature limit	50 °C
Dual filter software	2/220 seconds
Current loop	4/20 mA isolated
Protocols	B&C ASCII e Modbus RTU (03, 06, 16 functions)
Baud rate	2400 / 4800 / 9600 / 19200 baud
Probes ID	01/99 (B&C protocol) 01/243 (Modbus protocol)
Probes network	32 max.
Operating temperature	60 °C max.
Operating pressure	6 bar at 25 °C (TU 8555) 1 bar at 25 °C (TU 8355)
Dimensions TU 8355	L=165 mm, D= 60 mm
Dimensions TU 8555	L=143 mm, D=40 mm
Weight TU 8355	Body 420 g, cable 640 g
Weight TU 8555	Body 160 g, cable 640 g
Body	PVC-C (TU 8555.5 model in PVDF is available)
Cable	10 m (100 m max.), PVC sheath
Protection	IP 68

RWT S73D

Submersible MLSS Sensor

The Australian designed and built S73D submersible sensor has been optimised for measuring mix liquor suspended solids (MLSS) in aeration basins commonly found in biological wastewater treatment plants.

The sensor can be mounted in your process via a hand rail mount, as seen in the diagram, or by chain/cable suspended vertically into the tank.

It also has an in-built nozzle for automatic air or water cleaning. Minimising the requirement for mechanical cleaning by maintenance staff.

The RWT S73D comes with a base calibration from the factory. However, It can be calibrated to your laboratory MLSS test when combined with a MXD73/75.

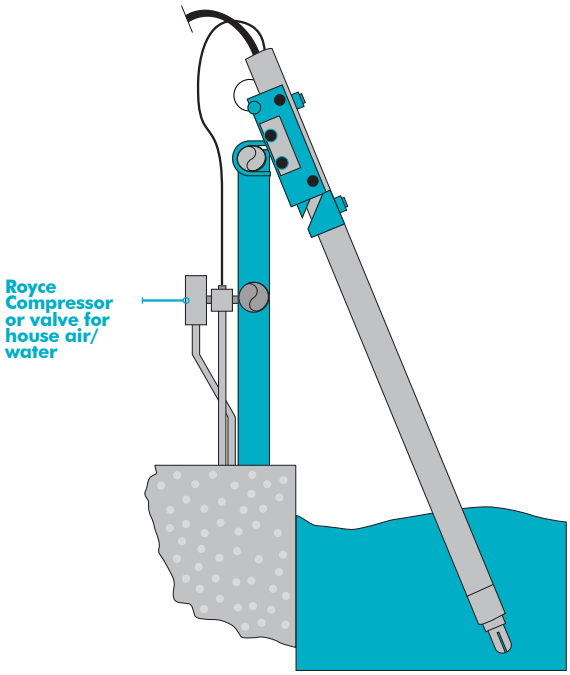
While the sensor is commonly used for continuous measurement of suspended solids in aeration basins the S73D it is not limited to this application. Other applications include return sludge lines and pits, SBR systems, primary clarifier effluent and wastewater monitoring for industrial plants.

Features

- Inbuilt air/water jet cleaning - compressed air or town water supply
- Pressure - up to 4 bar
- Made from PVC, so no corrosion as with aluminium or stainless steel sensors
- Would you like MLSS with your DO? RWT S73D can be retrofitted into existing MXD73/75 analysers.

Technical Specifications

Type	Single Gap, Optical; self cleaning
Range	0 - 20,000 mg/l
Accuracy	± 0.5% of FS reading or ± 100 mg/l, whichever is greater
Repeatability	±1% of reading or ± 20 mg/l, whichever is greater
Operating Limits	Temperature: 0 - 50°C
Pressure	0 - 4bar
Dimensions	Ø = 60mm, L= 110mm
Material	PVC



These sensors can be used with MXD73/75 Analyser on page 6

S3A

Automated Suspended Solids Settlement Analyser for SVI and SSVI

The Suspended Solids Settlement Analyser (S3A) reduces the time required for manual testing of MLSS, SVI, SSVI and supernatant clarity. The analyser provides automatic and consistent results without an operator being in attendance, at a comparable price to manual units.

Features:

The S3A allows a MLSS sample to be analysed for settlement characteristics, such as MLSS and SVI, and to determine fractional layers over specific time frames without tying a technician to a bench to perform a manual test and calculations.

Automatic results are printed in a clear and concise fashion and remain displayed until the operator is able to return to the sample after attending to other operational duties. The last set of results are also available for display if the S3A is inadvertently switched off prior to the return of the operator.

The S3A is supplied in it's own carry case, with two sample tubes and stopper, 9v charger and cable, and User Manual. After a simple tuning process to your plant MLSS, the S3A is ready to commence testing.

Measured Parameters:

- MLSS – Mixed Liquor Suspended Solids
- SSL – Settled Sludge Level
- SVI – Sludge Volume Index
- Supernatant clarity
- Floating Sludge
- Optional Stirrer can be supplied for SSVI Tests

Benefits:

- 200ml sample – no buckets – saves time
- Results produced automatically – no attendance or calculation required
- Indicates floating sludge – further indication of potential compliance issues
- Spare sample test tube supplied – minimise on-costs
- Comparable cost to manual jar test equipment affordable automation

BlueTrace Plus

Oil in Water Sensor

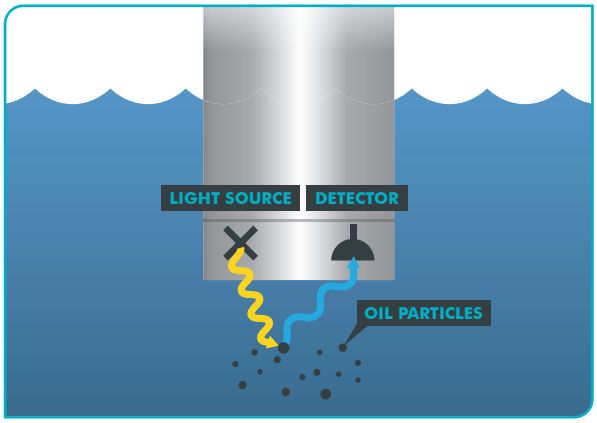
When light of a certain wavelength hits an oil particle, the oil emits light of a different wavelength shortly after excitation. This effect is called fluorescence.

Fluorescence occurs not only in oils, but also in other substances. The BlueTrace oil in water sensor uses this effect to determine the concentration of refined oils in water.

A transmitter installed in the sensor emits light at around 280 nm. The oil particles in the water absorb this energy and then emit light in a range from 300 to 400 nm. This light is measured by a detector.

The Jablonski diagram shows the fluorescence effect in detail. The oil particle absorbs the energy of the light, changes to a higher, unstable energy level and then falls back to the lower energy level. Part of the energy is released by the fluorescence effect. The intensity of the fluorescence is directly dependent on the concentration (see equation). By measuring the intensity at the detector, the concentration of the oil in the water can be determined.

The BlueTrace Plus - Oil in Water Sensor is a compact fluorescence probe for the measurement of BTEX, PAH and refined oil in water. The sensor features an integrated wiper system. The robust design allows for applications in harsh conditions, such as corrosive media or at high pressure.



Features & Benefits

- **Easy calibration:** The BlueTrace can easily be optimally calibrated to the specific application. All you have to do is hold the sensor in the prepared samples and then perform a multi-point calibration.
- **Selectable Measuring Range:** The sensitivity of the receiver can easily be changed either directly on the controllers of GO Systemelektronik, or with the help of the freely available PC program.
- **Modbus Interface:** The BlueTrace features a Modbus RTU interface. This means that the sensor can not only be connected to a GO Systemelektronik controller, but can also be integrated into third-party controllers or directly to a PLC.
- **Robust Design:** Settings or calibrations are stored directly on the sensor and can be adapted with the freely available PC program.

Applications

- **Wastewater:** Influent of WWTP, Monitoring of wastewater of industrial plants
- **Drinking Water:** Influent of dirnking water plants, Influent to desalination plants
- **Environmental Monitoring:** Detection of contamination, Maritime applications
- **Process Monitoring:** Cooling water, Leakage detection

BlueTrace Plus

Turbidity Sensor

The BlueTrace Plus - Turbidity Sensor is a compact probe for the measurement of Turbidity and Total Suspended Solids (TSS) in water. The sensor works according to the scattered light measuring principle and features an integrated wiper system.

Parameters

- Turbidity
- Total Suspended Solids (TSS)
- Temperature

Functions & Features

- Integrated Wiper
- Insensitive to Ambient Light
- Adaptable Measuring Range
- Easy Calibration
- Robust & Non-corrosive

Smart Wiper System

The Smart Wiper System is specifically designed for the reliable and efficient cleaning of sensors and optical surfaces. Regular, automated cleaning reliably removes contaminants and thus minimises measurement errors, and maximises process reliability. The Smart Wiper System offers extensive programming options for cleaning profiles and intervals. Thanks to its robust construction, the system, is ideally suited for use in harsh environmental conditions.

Valmet TS

Microwave Solids Sensor

For more than ten years Valmet's microwavebased solid content transmitters have been used in the process industry for highly demanding applications. Valmet TS has been developed from third generation microwave solids transmitters, combining cost-efficiency with the extreme accuracy of microwave technology. The new transmitter meets the needs of wastewater treatment plants – with no compromises in accuracy. The 500 references in global waste water industry speak for the excellence.

Applications

Sludge pumping from primary & secondary sedimentations / Feed to Thickening: Sludge pumping control based on reliable total solids measurement, and thus optimising sludge quality early on in the process, is vital for the whole sludge handling procedure.

Digester feed: Maintaining a high, optimised total solids content in the sludge entering the digesters helps to achieve better process control and significant savings. Sludge digestion time can be increased to produce more biogas.

Dewatering: Significant savings can be achieved through better dewatering control: a reliable total solids measurement helps to optimise polymer dosing and thus reduce polymer costs.

Dry Cake: The Valmet TS can be installed in the feed line to the incinerator, immediately after the sludge cake pump.

Benefits

- Lower energy consumption in dewatering, better utilisation rate in energy production
- Higher pumping capacity means higher water processing volumes and helps to postpone investments
- Better utilisation of solids transportation capacity
- Lower polymer onsumption
- Highly efficient use of dewatering centrifuges
- Less laboratory analysis
- Provides higher solids content in sludge

Technical Specifications

Measuring range	0 – 40 % TS. If more than 16 % TS
Repeatability	±0.01%Cs
Sensitivity	0.001 %Cs
Damping	1 to 99 s
Ambient temperature	–20…+70 °C (–4…+158 °F), protect from direct heat radiation
Sensor sizes:	PN16 DN50, 80, 100, 150, 200, 250, 300 PN 100 DN100, 150, 200
ATEX Certificate	No. VTT 12 ATEX 058X, II 3G Ex nR IIC T6 Gc
Options	Glass-lined versions available
Enclosure class	IP 65 (NEMA 4)
Operating voltage	90…260 VAC / 0.1 A
Wetted materials	WFT sensors AISI 316, AISI 316L, Ceramic gasket EPDM, Simrit 483
Current output	Total solids 4 – 20 mA + HART® 18 to 35 VDC
Secondary output	Process temperature/Conductivity 4 – 20 mA 18 – 35 VDC
Binary inputs	2 inputs, isolated 12 – 48 VDC
Communication	PC-connection RS-232 PROFIBUS PA Support for Valmet FieldCare
pH-range	2.5 – 11.5
Process temperature	0…+100 °C (+32…+212 °F)
Operating pressure	Recommended minimum process pressure >1.5 bar (22 psi), No entrained air. If less than1.5 bar (22 psi), please consult Royce Water Technologies.
Vibration max.	20 m/s2, 10 – 200 Hz
Pressure rating	PN16 bar (232 psi) standard. PN100 bar (1440 psi) option for FT100/150/200 (4"/6"/8") sensors

Valmet DS

Post De-Watering Dry Cake Solids Measurement

Solids measurement of dried wastewater sludge (dry cake) at waste water treatment plants contributes to significant savings in polymer dosage, energy and dewatered solids transportation.

Valmet dry solids measurement (Valmet DS) utilizes microwave technology, requiring no special certification or safety procedures, to make a stable and accurate solids measurement for dewatering control in waste water treatment. DS extracts a continuous sample from the falling cake flow after a centrifuge or screw press and measures the solid content before returning the sample back to the process.

Feedback control using the accurate dry solids measurement provided by DS can fully optimize polymer dosage and provide energy savings through better torque control of the centrifuge.

Maximizing drying efficiency to a target dry cake solids content can provide additional savings with reduced transportation costs and improved power boiler combustion.

- Reliable screw based sampling
- Solids range of 15–35 %
- Built-in calibration routine
- Industrial Internet remote access

In addition to full remote access of DS functions, measurement data, alarms and diagnostics via the Industrial Internet, the Valmet DS Ethernet connection can be used for local control with a laptop or tablet computer during commissioning.

Operation

Valmet DS is typically located in the downfall section of the dry cake. A sample retrieval screw feeds a return screw which compresses and pushes the sample through the microwave sensor chamber before being returned to the process. The DS measurement is based on multivariable microwave resonance, compensated for varations in material temperature and calibrated during commissioning with samples taken from the screw and oven dried.

Continuous stable measurements

The necessity for time-consuming manual laboratory measurements can be significantly reduced with Valmet DS. Also, uniquely to Valmet DS's measurement technology, the sample is extracted from falling cake flow after a centrifuge or screw press, before returning the sample material back to the process. Continuous measurements mean the results can be immediately utilized without needless delay from manual sampling and laboratory analysis. This offers better feedback control and real-time assessment of dewatering efficiency.

The solutions to trust

Valmet's measurement and automation solutions perform, so your staff and resources can be better focused on reaching your business goals. We have the experience and know-how in technology to give your plant measurable results, when you need them – bringing significant savings and a speedy return on investment for your business.

Benefits

- Minimised transportation costs of dry cake
- Optimised polymer dosage and torque of the centrifuge
- Reduced fuel consumption at combustion plant
- Optimization of total solids value of dry cake
- Better oversight of dewatering and process efficiency

Features

- 100% safe microwave technology
- Up to 25% or more polymer reduction

Technical Specifications

Sensor material	Ceramics / Body Aisi 317L
Measuring range	15…35 % Solids-%
Material measured	Material measured Municipal dried wastewater (sewage) cake
Temperature-range	+0…65 °C
Repeatability	0,01 %
Resolution	0,001 %
Mill system interface	4…20 mA, Ethernet
Power	24 VDC (measuring elecronics) 3 phase AC (sample screws)*
IP-classification	IP65

PROUDLY MADE IN AUSTRALIA

AQUAMETA™
Easy water tank level display and control

Model PF Hydrostatic Level Sensor

The 420 series of 4-20mA pressure transducers are a cost effective and robust solution designed for continuous water level measurement where a 4-20mA output is required. It may be used with other liquids that are compatible with its wetting materials which are UPVC, Nitrile and Aluminum Oxide. The sensor includes temperature and barometric pressure compensation.

Transducer Construction

This state of the art pressure sensor uses a flush Aluminum Oxide Ceramic diaphragm in conjunction with on-board signal conditioning to measure pressures. Pressure and temperature calibration is done electronically with the internal applicationspecific integrated circuit (ASIC). When pressures and temperatures change, the electronics provide an offset and span correction. It also includes aging detection and compensation. This new method guarantees good precision and long term stability. The sensor is encapsulated in a UPVC body that is filled with an epoxy. The sensor cable is molded into the transducer eliminating problems associated with threaded plugs. This design ensures a very high level of reliability.

Output Signals

The 420 transducer uses a two wire 4-20mA output signal. The signal is linear with pressure. The sensor will operate with a supply voltage that can range from 9V to 30V DC. The Aquameta Junction box may be used to extend the transducer cable with any other cable. The vented junction box has a Gortex covered opening that allows venting to atmosphere to take place whilst restricting the ingress of moisture.

Features

- 4-20mA output
- Power Supply 9 to 30V DC
- Temperature compensated
- Barometric pressure compensation via vented cable
- High linearity and low hysteresis values
- EMI Certified
- Excellent resistance to corrosion and abrasion
- Automated offset and span correction
- Age compensation

Applications

- Dams
- Resevoirs
- Storage Tanks

This sensor can be used with BXD17 controller on page 10

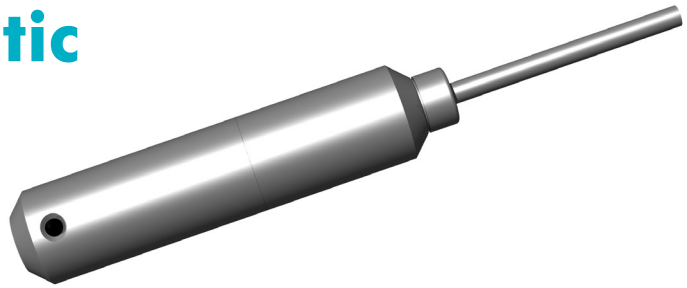
Technical Specifications Aquameta Sensors

For the entire range of Hydrostatic Sensors visit www.roycewater.com.au

Part #	Description	Medium	Pressure Range	Power Supply	Output	Medium Temp.	Accuracy	Cable Length
PF420-xxbar-xxmetres	Hydrostatic level sensor, semi flush face with standard PVC cable	General water and wastewater sensor	0.5, 1.0, 5.0 bar	9 - 30 VDC	4-20 mA	0-40°C	+/- 0.5% FSO	10.0 m Custom available
CR420-xxbar-xxmetres	Hydrostatic level sensor, closed face with standard PVC cable	General water and wastewater sensor	0.5, 1.0, 5.0 bar	9 - 30 VDC	4-20 mA	0-40°C	+/- 0.5% FSO	10.0 m Custom available

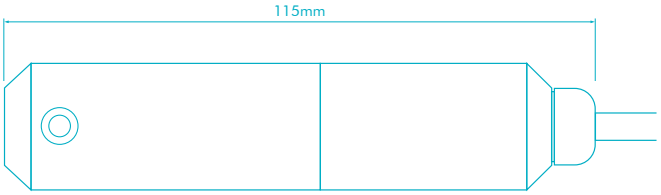
AQUAMETA™
Easy water tank level display and control

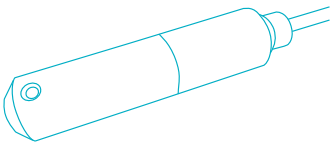
Model CR Hydrostatic Level Sensor

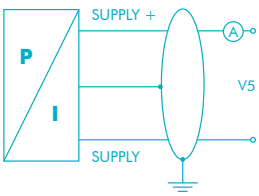


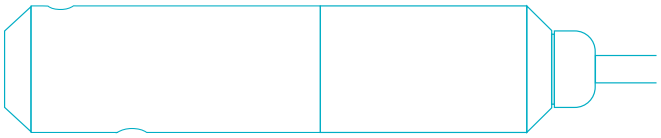
Specifications (For PF & CR)

Input pressure range		
Nominal pressure gauge [bar]	0.5	1 (5 Bar Optional - 50 metres)
Level [mH_2O]	5	10
Overpressure [bar]	1	2
Burst pressure ≤ [bar]	2	4
Output signal / Supply		
Standard	2-wire: 4… 20 mA/Vs = 9 … 35Vdc	
Performance		
Accuracy	≤ ± 0.5% FSO	
Permissible load	Rmax = [(Vs – 9)/0.02A]Ω	
Influence effects	Supply: 0.05 % FSO/10V Load: 0.05 % FSO /kΩ	
Long term stability [%FS/year]	≤ ± 0.3 @ 25 [°C]	
Response time	≤ 5ms	
Thermal Effects(Offset and Span)		
Thermal error	≤ 0.007mA/10[°C]	
Permissible temperatures	Medium: -25/+65[°C]	Storage: -40/+135[°C]
Electrical protection		
Short-circuit protection	Permanent	
Reverse polarity protection	No damage – no function	
Norms compliance	Radiated electromagnetic field IEC/EN 61000-4-3(2006) Electrical fast transition burst IEC/EN 61000-4-4(2004) RF conducted disturbances IEC/EN 61000-4-6(2006)	
RoHS compliance	RoHS	
Electrical connection		
Cable with sheath material	PVC (0 … 65°C) black	
Standard cable length	10m (Custom cable lengths available)	
Materials (media wetted)		
Housing	U-PCV grey	
Seals	Nitrile	
Diaphragm	Ceramic AL_2O_3 96%	
Miscellaneous		
Current consumption	Min 3.8mA Max 20.4mA	
Weight	± 135g (without cable)	
Ingress protection	IP 68	
Country of origin	Australia	

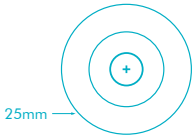








*CR SENSOR SHOWN - PF IS SIMILAR



Wiring diagram
2-wire-system (current)
Pin configuration

Supply+	Red
Supply-	Black
Shield	Ground wire bare

ENV120

Ultrasonic Sludge Blanket Monitoring System

The ENV120 Ultrasonic Sludge Blanket Level Meter, utilises enhanced ultrasonic technology to measure the sludge interface level in various types of clarifiers, settling tanks and thickeners with superior accuracy and reliability.

The instrument continuously provides the user with important information which includes numeric and graphic screens representing the distance to the blanket, an echo profile image to ensure correct configuration during commissioning and saved data analysis. Additional features such as ASF (Abnormal Signal Filter), allows elimination of irregular field noise which can result from moving structures intermittently obscuring the signal. The ENV120 technology additionally incorporates a compressed air cleaning system to maintain the sensor in optimum condition and guarantee maintenance-free measurement. Specially designed mounting kits are also available.

ENV120 FEATURES

- Continuous and Real-time Measurement
- 4 Sensors Measurement with One Controller Enables Economic Operation
- Maximum 400 Days Data Logging and Monitoring
- Wireless Option Avoids Cabling Cost
- Automatic Sensor Cleaning Guarantee Maintenance-free Measurement
- Built-in Unique Algorithm Eliminates Stationary and Moving Structures
- Free WESSWARE Software Enables Field Data Analysis and Menu Setup

APPLICATIONS

The ENV120 is designed to monitor the levels of solid contents (sludge) in various types of liquids (water, liquor, etc.), to control the pumps engaged in the processes, and to initiate events based on measured process conditions.

SOME APPLICATIONS

- Water & wastewater treatment clarifiers
- Water & wastewater gravity & DAF thickeners
- Raw water clarifiers
- Sumps, lagoons, settling ponds
- Industrial process thickeners
- Salt brine tanks
- Material inventory tanks
- Process thickeners

PRODUCT FEATURES

1. VARIOUS SCREENS: The instrument continuously provides the user with important information which includes numeric and graphic screens representing sludge level, current output, temperature, and an echo profile image to ensure correct configuration.

2. HIGH TEMPERATURE SENSOR & CHEMICAL RESISTANCE SENSOR

3. LIGHT SLUDGE LEVEL MEASUREMENT: The ENV120 is designed to measure not only heavy sludge (above 2,000mg/l) but light sludge at a drinking water sedimentation tank by selecting type of sludge from a menu section.

4. DATA ANALYSIS SOFTWARE: Free WESSWARE that can analyze the logged data and download the set parameters.

5. WIRELESS BLUETOOTH MODULE(WESS-RF): WESS-RF is a Bluetooth based wireless data communication system consisting of a master and a transmitter module. This system can be applied along with a controlling part of our measuring instruments such as ultrasonic sludge blanket level meter, density meter, level meter, etc. The WESS-RF system is normally used to reduce cabling cost and to apply where the bridge (walkway) moves. The WESS-RF offers not only mA output but also RS232 output.

Numeric

JUN 11 2004 10:00

3.92m

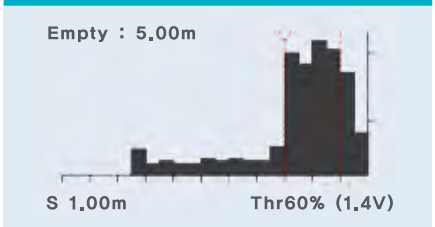
D 1.08m +24.5℃ 18.2mA

R1:OFF R2:ON ST02

NUMERIC SCREEN

LEVEL, TEMPERATURE, CURRENT OUTPUT, TIME, ETC.

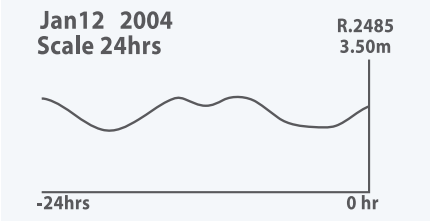
Echo Profile



ECHO SCREEN

SLURRY SETTLEMENT PROFILE

Trend Screen



DATA TREND SCREEN

LOGGED DATA TREND

OPTIONS

SWING BRACKET

The swing bracket is to secure skimmer passage at clarifiers. Once it has passed, the bracket is free to fall, re-immersing the sensor into the clarifier water by a damper. The swing bracket is needed when the rotating skimmer hits a sensor. It has limited guarantee period since it's mechanical device.

CLEANING UNIT

Periodical sensor cleaning is recommended as a precaution since floating debris and biological material are in contact with the ultrasonic sensor. The cleaning unit consists of a 10-meter length Ø6 air hose and an air compressor with terminal connection. The AC power source is given by a controller. For DC operation, additional power source or solenoid valve may be required for independent usage.

CABLE LENGTH

The standard cable length of sensor is 10m(33ft). To accept field requirements, the cable can be extended to 100m(330ft).

WIRELESS MODULE

The blue-tooth based wireless module is needed where additional cabling costs is much higher than wireless network. The communication range is maximum 200m at an open field. Since transceiver module is mounted inside of a controller, no additional enclosure is required for outdoor installation. The WESS-RF offers not only analog output but also RS232 output.

MOUNTING KITS

We offers several types of mounting kits, such as sensor mounting kit, controller mounting kit, and cleaning unit mounting kit.

DIGITAL COMMUNICATION

ENV120 provides RS232C digital communication as standard. RS485 and Profibus-DP are available as an option.

INSTALLATION

PROBE

Do not inflict impact or unnecessary external force on the probe during handling. The ultrasonic head, which transmits and receives sound waves, should be handled with extra care and stored wrapped in sponge or other soft materials to absorb the impact of an external blow.

Attach and secure the probe using the 3/4" PF male thread located on the upper section of the probe. Pipe length selection should be based on the lowest liquid level. The pipe's material should be chosen in consideration for material strength or application fluid characteristics. STS 304 20A, 10S pipe is the preferred choice in most applications. The cleaning air supply tube connects to the probe's one- touch fitting only if the cleaning device is used.

Position the probe at a location where the ultrasonic signal from the bottom of the pool or tank is not blocked by surrounding structures (agitator, pipe, etc.). Additionally, to ensure stable measurement, the probe should be positioned away from air bubbles and active floating solids resulting from sudden changes in velocity. For tank or rectangular pool applications, maintain at least 1m of separation distance from the wall to minimize interference and try to avoid a hopper area where the shape of sludge blanket varies upon pumping activity.

CONTROLLER

Protect the controller from impact and unnecessary external force until it is installed. Install the controller on a panel/handrail or wall using the mounting holes (Φ 8) located at the back of controller.
Located on the bottom of the controller are four cable glands the user can use selectively for his/her specific application. Each cable gland should be connected using a cable of correct diameter (Φ 4.5 ~ 10mm) to ensure IP67.

Most products generally use the direct cable connection method, in which stripped wires connect directly to a terminal block (TB). This makes for a difficult wiring process because of the sheer number of wires in a confined space.

ENV100, on the other hand, utilizes a new wiring method that uses an additional plug connector for the primary wiring and then it connects to TB stationed on PCB.

POWER, WIRING & CONNECTIONS

POWER REQUIREMENTS

AC 100 to 240V, 50/60Hz, <6W. Use copper conductors only. A user-supplied disconnect switch on a separate 15A circuit breaker should be located near the processor unit. Power line noise and interference are filtered by a built-in EMI filter.

PROBE WIRING

A 10m (33ft) of probe telemetry cable is supplied as standard. Contact your authorized distributor for extensions. The maximum length of cable extension is up to 100m (33ft) when authorized cable is in use.

USER CONNECTIONS

The controller supports up to 5 parts of connections. Connections include Probe, mA and Serial Outputs, Relay Output, Cleaning Device, and Power. The controller accommodates up to 5 parts of connections.

PROBE CONNECTION

Connect the five respective colored wires from the probe cable to a 5- position PHOENIX connector and then put it into the PCB board.

SERIAL COMMUNICATION

Serial communication (RS232/485) users may connect the serial wires to a 5-position PHOENIX connector and put it into the PCB board. The 5-position connector is composed of serial communication and analog output connections.

ANALOG OUTPUT

4 to 20mA current output users may connect the wires to a 5-position PHOENIX type connector and put it into the PCB Board.

RELAY OUTPUT

Relay users may connect the wires to a 9-position PHOENIX type connector and put it into the PCB board.

CLEANING DEVICE

The cleaning device is activated using the controller's power source. Connection is made using a 2-position PHOENIX connector. Use AC power.

POWER CONNECTION

An external power source (100 to 240V, 50 to 60Hz) activates the ENV100. Connection is made using a 3-position PHOENIX connector.

SPECIFICATIONS

CONTROLLERS

The control device has two types. One is for single measurement and the other is for multi measurements.

C1-S (1CHANNEL)
C1-M (4CHANNELS)

MODEL	C1-S	C1-M
Measuring Principle	Ultrasonic echo flight time	Ultrasonic echo flight time
Measuring Range	0.35~10m	0.35~10m
Resolution	1cm	1cm
Measuring Pulse	5~25 times/sec	5~25 times/sec
Measuring Density	Heavy/ Light	Heavy/ Light
Accuracy	+/- 1 % of measuring range	+/- 1 % of measuring range
Operational Temp.	-20 ~ 10°c	-20 ~ 10°c
Sensor Control	1 channel	Multiple channel (Max. 4 channel)
Data Logging	Max. 400 days	Max. 400 days
Screen	Numeric, Echo Profile, Data Trend, Parameter	Numeric, Echo Profile, Data Trend, Parameter
Display	Level.Distance, Temperature, Time, Current, Echo profile, Measuring status	Level,Distance, Temperature, Time, Current, Echo profile
Outputs	Current: 4~20mA, nom. Load 250Ω (load range : 100 ~ 750Ω) Relay : 3 SPDT (5A, 250VAC) Digital: RS232C(Standard), RS485	Current: 4~20mA, nom. Load 250Ω (load range : 100 ~ 750Ω) Relay : 3 SPDT (5A, 250VAC) Digital: RS232C(Standard), RS485
Power Supply	Standard : 100 ~ 240V AC, 50~60Hz, ≤6W Option : 20~30V DC	Standard : 100 ~ 240V AC, 50~60Hz, ≤6W Option : 20~30V DC
Enclosure Material	Body/Cover : Polycarbonate	Body / Cover : ABS Window : Polycarbonate
Weight	3 kg	3.2 kg
IP Rating	IP67	IP67
Certificate	CE	CE

SENSORS

ENV100 has 3 types of sensors to accommodate most field demands. S1G is one of the most widely used sensor model. S1T is used to corrosive chemicals and S1H is used to high temperature liquid.

S1/G/T

S1/H

MODEL	S1G/T		S1H
Material	S1G Body: S.S. 304 Head: Epoxy	S1T Body: S.S. 316 Head: Teflon	Sensor Body: Teflon Head: Teflon
Cleaning	Air-jet (built-in cleaning nozzle)		Air-jet (built-in cleaning nozzle)
Mounting Thread	3/4" PF Female Thread		Optional
Cable Length	10m		10m
Operational Temp.	-10~60°C		-10~100°C
Beam Angle	3 degree		3 degree
Frequency	160/380kHz		160/380kHz
Weight	2.2kg (incl.10m Cable)		4kg (incl.Junction Box)
IP Rating	IP68		IP68

ENV200

Ultrasonic Sludge Density Meter

The ENV200 is an ultrasonic instrument that measures the density of suspended solid in liquid. It comprises of sensors, a controller, and a junction box. ENV200 with PCM(Process Condition Monitoring) algorithm measures not only the size of received signal, which is often measured by conventional ultrasonic density meters but also observes changes in sound velocity and temperatures in the process. As it monitors operational status and water status in pipe and then decides the validity of each measurement, it contributes to increasing stability and reliability of the measurement.

The ENV200 utilises the EEA (Envelope Energy Average) method that saves reception signal envelop and then calculates its energy, rather than using the reception signal's amplitude change. ENV200 offers three types of sensors, such as spool-piece, tank-mount, and Clamp-on type to accommodate all field demands at installation.

Features

- Continuous and real-time measurement
- Reliable signal control EEAM(Envelope Energy Average Method) algorithm
- Various types of sensors to accommodate all field demands at installation
- Offer several density units, %, g/l, ppm, kg/m^3, g/cm^3
- Maximum 400 days data logging and monitoring
- In-situ measurement and calibration

Applications

- Water / Wastewater Treatment
- Pulp and Paper
- Food and Beverage
- Power Plant
- Chemical
- Mining

Measuring Algorithm

EEAM

Conventional ultrasonic attenuation density meter just determines density with amplitude of received signals. Unlike this, ENV200 is able to measure changes of concentration in a more sophisticated manner by adopting the patented EEAM (envelope energy averaging method), which measures not only the amplitude of received signals but also observes the shape of signal. It takes all energy as envelope and then convert it into density

PCM (Process Condition Monitoring)

PCM algorithm consists of SOS filter that measures sound velocity of measuring fluid (S.S. mixed water); temp filter that measures temperature; and signal filter that monitors quality of received signals. Operational status (process run/stop, pipe full/empty) is determined by the combination of SOS filter and Temp filter. Signal filter helps to decide the valid S.S. distribution.

Since the PCM algorithm assimilates many measurements identifying changes of process condition (water status in pipe, and S.S. distribution pattern), its intelligence is designed to measure only valid S.S. concentration. Consequently, the performance is much more reliable and accurate, compare to conventional measurement.

Technical Specifications

Measuring Principle	Ultrasonic Attenuation and EEAM(Envelope Energy Average Method)
Measuring Range	STD. 0 ~ 200,000mg/l (0~20%) OPT. 0 ~ 400,000mg/l (0~40%)
Resolution	0.1% or 0.01% (Selectable)
Measuring Mode	Process Mode, Real-time Mode
Accuracy	+/- 1% of F.S.
Repeatability	+/-1% of reading
Operating Temp.	-20 ~ +70°C
Outputs	Current : 4~20mA, nom. Load 250Ω (load range : 100 ~ 750Ω) Relay : 3 SPDT(5A, 250VAC) –"ER" "R1" "R2" Digital: RS232(STD.), RS485(Option)
Power Supply	STD. 100 ~ 240V AC, 50~60Hz, ≤6W OPT.1 10 ~ 14VDC, OPT.2 22 ~ 26VDC
Enclosure Material	Polycarbonate
Dimension	252(W) x 238(H) x 124(D)mm
Mounting	Hole center 152(W) x 236(H) mm (Ø8 x 4ea)
Weight	2.2 kg
IP Rating	IP67

ENV200-C

Clamp-on Type Ultrasonic Density Meter

CONTROLLER

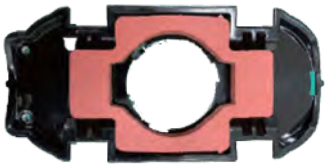
- Drives ultrasonic sensor and filters effective signal
- Converts envelop signal energy to density value
- Automatic gain control guarantees less maintenance
- Offers automatic frequency adjustment:

- Patented measuring algorithm, EEAM
- Automatic gain control, AGC
- Automatic frequency adjustment, AFA

SENSORS

- Measure the density at outside of existing pipe line
- Applicable pipe materials:

- Stainless steel, carbon steel
- PA, PVC, PVDF, etc.



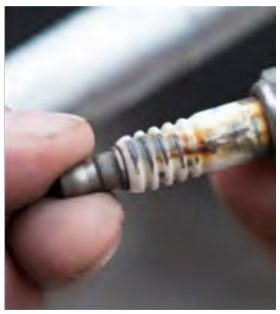
OPTION - INGRESS PROTECTION PAD (IPP)

- Ingress protection pad protects water ingress at outdoor application
- IPP minimises the impact on humidity, dust, vibration, etc. and extends the lifespan of sensor couplant.

FEATURES

NO MAINTENANCE

- No sensor cleaning is required for sludge adhesion on sensor surface.
- No sensor replacement is required for wear and tear by flowing.



NO ADDITIONAL COST

- No additional pipe section is required for sensor cleaning and installation.
- No by-pass line is required for maintenance.
- No additional cost is required for sensor installation and reposition.

NO LIMIT AT INSTALLATION

- Clamp-on and small sized sensors enable narrow space and high positioned installation.

NO LIMIT ON MEASURING MEDIUM

- Able to measure any type of liquid and sludge regardless of adhesion, abrasion, and corrosion.
- Inner pipe scale is okay with one-time calibration.

CL 6587.103

Free Chlorine Controller

The CL 6587.103 triple input analyzer belongs to the latest series of instruments developed by B&C Electronics.The instrument includes our 40 years' experience and knowledge in the measurement and control of residual chlorine, pH and ORP. The pH, ORP and temperature sensors in our catalog allow the simultaneous display of these measures in addition to the fourth value provided by one of the sensors of the main oxidizing substances, such as residual free chlorine, combined and total chlorine, chlorine dioxide, dissolved ozone, hydrogen peroxide and peracetic acid, which are compatible with the analyzer. All these possible solutions make the controller suitable for virtually any application and type of sample.

Main Features

Range
0 ÷ 200.0 ppb / µg/l
0 ÷ 2.000 ppm / mg/l
0 ÷ 20.00 ppm / mg/l
0 ÷ 200.0 ppm / mg/l
0 ÷ 2000 ppm / mg/l
0 ÷ 14.00 pH
-2000 ÷ 2000 mV
-10.0 ÷ 110.0 °C, 14.0 ÷ 230.0 °F

Technical Specifications

Inputs	potentiostatic sensors polarographic membraned sensors pH electrodes (glass/antimony) ORP Pt100 / Pt1000
Zero	± 20%, ± 5.0°C, ± 9°F
Sensitivity	12.5 ÷ 250 %
Resolution	1 digit
Accuracy	0.2%
Repeatability	0.1%
Non linearity	0.1%
Dual filter software	0.4 ÷ 50.0 seconds for small and large variations
Dual analog output	0-20 mA / 4-20 mA Rmax 600 Ω
Digital output	RS485 isolated, protocol B&C ASCII and MODBUS (function 03)
Dual set point HI/ LO	ON/OFF - PID - PFM - PWM, SPST relays
Hysteresis	0 ÷ 10 %
Delay	0 ÷ 100.0 seconds
Alarm	SPDT relay with delay 0 ÷ 100.0 seconds
Cleaning function	off / autoclean / manual, relay SPDT repetition time 0.1 ÷ 100.0 hours cleaning time 1.0 ÷ 60.0 seconds holding time 0.0 ÷ 20.0 minutes
SPST and SPDT relay contacts	220V - 5 A resistive load
Operating temperature	-10 ÷ 60 °C
Humidity	95% without condensation
Power supply	85 ÷ 264 Vac - 50/60 Hz 9 ÷ 36Vdc, 12 ÷ 24Vac (option 091.42x)
Terminal blocks	removable
Weight	1360 g
Enclosure	ABS, IP 65 protection
Dimensions	256 x 230 x 89 mm
EMC/RFI conformity	EN 61326
Registered design	002564666-002

SZ 283

Free Chlorine Sensor

Technical specifications

Electrodes	2 Platinum rings
Reference	gel with annular junction
Body	glass
Cable	3 m
Max pressure	10 bar at 20°C
Dimensions	110x12 mm

SZ 7261

SZ 7231

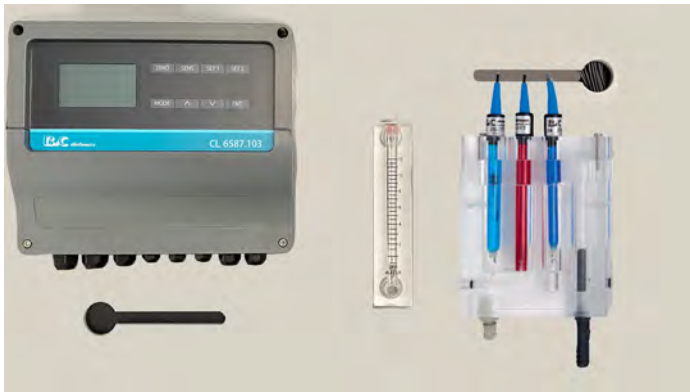
SZ 72x3

Free Chlorine Flow Cells

This series of cells is made for the measurement of Free residual chlorine, Chlorine dioxide and dissolved Ozone with a potentiostatic sensor SZ 283. The cell's manufacturing characteristics allow the sample to run through the potentiostatic electrode site with a constant velocity. The in-flow can be regulated through a check valve. The models SZ 72x1 cell is for the potentiostatic electrode and the Temperature sensor, while the SZ 72x3 cell is also for additional pH and O.R.P. electrodes. The supply includes the necessary tubing for grabbing the sample, along with wall mounting accessories.

SZ 7263

SZ 7233



Technical Specifications

Material	clear acrylic resin
Inlet	1/4" fitting
Outlet	fitting for 10x14 mm tubing
Connection tubing	2 m 4x6 tubing
Flow	about 10/30 litre/hour approx
Temperature	0/50°C
SZ 7263 dimensions	diameter 65 x 150 mm
SZ 7261 dimensions	diameter 55 x 150 mm
SZ 7233 dimensions:	150 x 120 x 40 mm
SZ 7231 dimensions:	150 x 90 x 40 mm
Sensors site	diameter 12 mm for pH/ORP/Cl diameter 5 mm for temperature
Suggested sensors	pH = SZ 165 ORP = SZ 275 Cl2 = SZ 283

KUNTZE

NEON® ONE

Reagentless Free and Total Chlorine Measurement with pH Compensation

The NEON® ONE platform is a versatile and intelligent water quality monitoring system, designed for precise measurement, seamless automation, and real-time data access. Whether drinking water, swimming pools, industrial water treatment, or process control, NEON® ONE delivers reliable and scalable solutions tailored to your application. With its modular architecture, NEON® ONE allows flexible sensor integration, multiple communication options, and advanced automation functions – ensuring efficiency, accuracy, and ease of operation.

Accurate Measurement as the Core Function

NEON® ONE delivers precise and reliable measurements, providing the foundation for effective process control and informed decision-making. With optimized pH prioritization, automatic range adjustments, and guided calibration, NEON® ONE minimizes measurement drift and maximizes data accuracy. Smart diagnostics continuously monitor sensor health and stability, providing real-time feedback to reduce maintenance efforts and prevent unexpected measurement failures.

Features:

- Wide Parameter Coverage – Supports free chlorine, total chlorine/biocides, pH, ORP (Redox), conductivity, sulfite and flow & temperature (FT) to meet diverse application requirements.
- Stable & Interference-Free Readings – Advanced signal processing and digital communication ensure high measurement accuracy with minimal external interference.
- Sensor Calibration & Automated Validation – Integrated calibration storage and optional Validation Software enhance long-term accuracy, particularly in low-chlorine environments.
- Minimal Maintenance with ASR® Cleaning – The Automatic Sensor Cleaning System (ASR®) removes contaminants and biofilms, maintaining long-term sensor accuracy without frequent manual cleaning.
- STABIFLOW® ONE – Optimized Flow Conditions– STABIFLOW® ONE flow cells ensure stable sensor placement, preventing measurement fluctuations due to changing water conditions. .
- High-Precision Sensor Technology – NEON® ONE utilizes ZIRKON® ONE digital sensors with integrated memory and advanced diagnostics for consistent and reliable measurements.

Applications:

- Industrial and Process Water
- Drinking Water
- Food and Beverage
- Swimming Pools

Durability and Sustainability

NEON® ONE is designed for long-term reliability and environmental responsibility. Its high-quality materials ensure durability in demanding water treatment environments, while advanced self-diagnostic and cleaning functions extend component and sensor lifespan. The ZIRKON® ONE sensors feature a replaceable electrode system, reducing electronic waste and lowering operational costs. By integrating energy-efficient components and remote monitoring capabilities, NEON® ONE minimizes maintenance efforts and supports sustainable water management practices.

Tailored Solutions for Every Water Treatment Challenge: Reverse Osmosis Pre-Treatment

Protecting RO membranes requires accurate chlorine monitoring in chlorine-free environments to prevent membrane damage while ensuring effective pre-treatment. NEON® ONE offers Validation Software, allowing automated switching to chlorinated water for sensor verification, ensuring reliable measurement accuracy even in low-chlorine conditions. In addition to chlorine monitoring, sulfite measurement is essential for detecting and controlling dechlorination agents.

NEON® ONE supports ZIRKON® ONE SULFITE sensors, providing precise sulfite monitoring to optimize pre-treatment processes. With its seamless data integration, remote access, and predictive diagnostics, NEON® ONE helps operators maintain membrane integrity, improve efficiency, and reduce downtime in RO applications.

Krypton® Multi

Reagentless Free and Total Chlorine Measurement with pH Compensation

Controlled and reliable measurements driven by Kuntze Krypton® systems. The measuring system includes all customers need for disinfectant measurement: instrument, sensors, assembly and cables. The Krypton® Multi is a measuring system for disinfectant, pH and temperature - optional ORP and 5th measuring input (Cl2, TCl or conductivity).

Kuntze Krypton® Multi are delivered fully assembled and ready to use.

All Kuntze products are made in Germany.

StabiFlow®

StabiFlow® is an assembly for precise measurement of disinfectants. Values are:

- Constant flow of approx. 30 l/h
- Stable, precise and reliable measurements
- Increased life expectancy of the electrodes

Cloud Connect®

Controlled water measurement process at any time, from any place, on any device. The solution is Kuntze Cloud Connect® service.

- Optimised asset utilisation
- Increased productivity
- Reduced maintenance costs
- Simple usability and precise control

ASR®

ASR® is their patented automatic sensor cleaning process:

- It keeps the electrode surfaces clean and reduces maintenance efforts automatically
- ASR® is available for measurement of free chlorine, chlorine dioxide, ozone and hydrogen peroxide

Cost reduction due to less maintenance:

- No manual cleaning
- No refill of chemical or physical agents
- Strongly reduced calibration demand

Technical Specifications

Disinfectants	Free chlorine, chlorine dioxide: 0.. 5.00 / 10.00 / 20.00 mg/l Ozone: 0.. 5.00 / 10.00 mg/l Hydrogen peroxide: 0.. 30.00 mg/l pH: 0-14.00 pH
Temperature	0.. 50.0 °C / 32.0.. 122 °F
ORP (optional)	-1500.. +1500 mV
5th measuring input (optional)	Total Chlorine: 0.. 10.00 mg/l, or Conductivity: 0 - 100,0 mS/cm
Digital Inputs	Flow control External controller stop 2x level control, activation 2nd or 3rd control parameter set

Sensors

Zirkon® DIS Total

TOTAL CHLORINE - Zirkon® DIS Total is an open potentiostatic sensor for measuring chlorine compounds

- No exchange of membrane
- No exchange of electrolyte
- No delicate plastic membrane
- Immune to air bubbles

Zirkon® DIS

FREE CHLORINE - Zirkon® DIS is a potentiostatic sensor for measuring Free Chlorine

- Low maintenance and robust
- Stable zero point
- Reliable measuring values
- Long operating life due to auto sensor cleaning by ASR®

Krypton® DIS

Free Chlorine Monitoring System without pH Compensation

Controlled and reliable measurements driven by Kuntze Krypton® systems. The measuring system includes all customer needs for disinfectant measuretment: instrument, sensors, assembly and cables. The Kuntze Krypton® DIS is used to measure free chlorine, chlorine dioxide, ozone or hydrogen peroxide, and temperature. Measuring parameter and range can be chosen via menu.

Kuntze Krypton® DIS are delivered fully assembled and ready to use.

All Kuntze products are Made in Germany.

StabiFlow®

StabiFlow® is an assembly for precise measurement of disinfectants. Values are:

- Constant flow of approx. 30 l/h
- Stable, precise and reliable measurements
- Increased life expectancy of the electrodes

Cloud Connect®

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Cost reduction due to less maintenance:

- No manual cleaning
- No refill of chemical or physical agents
- Strongly reduced calibration demand

Technical Specifications

Disinfectants	Free Chlorine/Chlorine dioxide/Total Chlorine: Up to 1000µg/l, up to 5.00 / 10.00 / 20.00 mg/l Cl_2 or ClO_2 Ozone: Up to 1000µg/l, up to 5.00 / 10.00 mg/l O3 Hydrogen peroxide: Up to 30.00 mg/l H2O2
Temperature	-30°.. +140°C (-22°..+284°F)
Digital Inputs	For external controller stop, low-water indication, or level monitoring Display text can be selected according to intended function Input can be set to N/O or N/C contact via menu

Total Chlorine Measurement now available

UNISENSE ENVIRONMENT

Greenhouse Gas Sensor

World's only sensor for dissolved N_2O direct from Bioreactor

Empowering Deammonification Process Controls with Direct N_2O Monitoring

The new possibility of measuring nitrous oxide (N_2O) in the deammonification process yields important insights about the anammox bacteria substrate availability. N_2O is tightly linked to the nitrite (NO_2-) concentration, the key substrate besides ammonium (NH_4+). To address the challenging control of the deammonification process, wastewater companies have invested in measurement technology from Unisense Environment. This enables them to measure N_2O levels directly in the process tanks, balance anammox bacteria substrates, and additionally document and minimize the climate impact of the deammonification process.

- **Cost effective** compared to off-gas equipment
- **Robust** sensor for 24/7 operation
- **Fast responding** in less than one minute
- **Independent** of airflow during denitrification

Large impact of N_2O on carbon footprint

N_2O is a product of both nitrification and denitrification during the biological treatment of wastewater. Through aeration it is subsequently striped and released into the atmosphere. N_2O is a highly disregarded greenhouse gas with a global warming potential 300 times higher than CO_2. Traditionally, N_2O emission from wastewater treatment plants has been estimated by use of the IPCC emission factor of 3.2 g/PE/year N_2O-N. This factor is an underestimate and studies in the Netherlands, France, USA, and Australia have shown, that for some wastewater treatment plants, the N_2O emission can account for up to 90% of their total carbon footprint.

Real-time emission estimation

Long term studies have documented a high level of performance, sensitivity, and durability of the N_2O Wastewater Sensor qualifying it as the perfect and reliable tool for continuous online measurements of dissolved N_2O. Moreover, direct comparison with well-controlled off-gas data has proven and validated the real-time emission data based on our N_2O sensor output.

N_2O wastewater system

- Measuring and assessing the amounts of N_2O being produced during wastewater treatment
- Minimising the large climate effect of N_2O by implementing new process strategies
- Reporting of greenhouse gas emissions from N_2O

True carbon footprint

In modern wastewater treatment the primary focus on energy savings and energy production has resulted in an increase in the production of N_2O leading to an increase in CO_2 equivalent emission. Therefore it is essential to look at the whole process to document the true carbon footprint.

Breakthrough bioprocess control with N_2O sensor

Combining today's wastewater bioprocess control know-how with the new industrial sensor for N_2O provides a significant potential in reducing the environmental load caused by this potent greenhouse gas. New state-of-the-art bioprocess controls can be developed, using input from the N_2O Wastewater System, yielding a clear environmental advantage over standard control regimes.

Wastewater Sensor Technical Specifications

Size	Robust design in 44 mm aluminum alloy casing (6063-T6) and black POM acetyl copolymer
Response Time	<45 sec
Built-in Temperature Sensory	Yes, N2O signal is temperature compensated
Calibration	2-point calibration, every second month
Guaranteed Lifetime	4 months
Expected Lifetime	>6 months
N^2O Sensor Head	Replaceable
Cable Length	5 meter standard | Optional: Extension to 100 m

Wastewater Controller Technical Specifications

Controller	TFT touch screen controller
Box Size and Weight	301.5 x 283.2 x 120.5mm, 3.2 kg
Housing	Surface-mounted case made of plastic (ABC) | IP67 - dust-resistant and waterproof
Mounting	Multiple holes for surface or pipe mounting - mounting plates and weather protection canopy available
Electrical Safety	According to EN 61010, part 1: Overvoltage category III, pollution degree 2
Power Supply	AC 110 to 240 V + 10/15%; 48 to 63 Hz
Sensor Inputs	2 x N2O Wastewater Sensor with built-in temperature sensor
Other Inputs	Optional: Air flow (m3/h), 4..20 mA | Optional: 2 x Air flow ON/OFF (Binary input - potential-free contact)
Sensor Output	2 x temperature compensated N2O value (N2O-N[mg/L])
Sensor Emission Output	2 x Emission calculations (N2O-N [mg/m3/d]) with standard fixed model parameters | Optional: Dynamic input parameters
Other Outputs	Internet, ModBus (serial or TCP) | Optional: 2 x N2O Wastewater temp. sensor | Optional: PROFIBUS-DP | Optional: USB datalogging - software required

PROUDLY MADE IN AUSTRALIA

Royce Aqua22

Portable MLSS and Sludge Blanket Level Meter

Features & Benefits

- Range - 0 to 20,000 mg/L
- Depth - 0 to 10 metres
- Cable length 10 metres (length to order if required)
- A hydrostatic level sensor is used to provide easy depth measurement of the interface layer.
- Smart serialised sensors holds calibration data internally. This means that sensor can be interchanged between handheld meters without the requirement to be calibrated.
- Light, ergonomically designed handheld with a pistol grip to facilitate one handed operations.
- Front cluster buttons in easy reach of a thumb resulting in easy selection of functions.
- The LCD display is optimised to provide excellent clarity in bright sunlight with or without Polaroid glasses.

Instrument Technical Specifications

Protection	IP65
Body Materials	ABS/Polycarbonate/ Acrylic
Weight	320g
Width	110mm
Length	240mm

Sensor Technical Specifications

Cable Material	Polyurethane
Cable Length	10m
Body Materials	UPVC/Nylon
Protection	IP68
Diameter	60mm
Overall Length	180mm
Weight	420g

Overall Technical Specifications

Measuring	MLSS and Sludge Blanket Analysis Interface Layer Analysis
Sensing Technology - MLSS	IR Absorption
Sensing Technology - Depth	Depth Hydrostatic Level Sensor
TSS Range	0 - 20,000mg/l
Accuracy	+-5%
Repeatability	1%

Royce Aqua22M

Portable MLSS / Sludge Blanket Level Meter / Dissolved Oxygen Measurement / pH Measurement / ORP Measurement / Level Measurement

Features & Benefits

MLSS & Sludge Blanket Level Measurement

- Range ±500 to 20,000 mg/L *depending on process fluid
- Depth - 0 to10 metres
- Cable length 10 metres
- A hydrostatic level sensor is used to provide easy depth measurement of the interface layer.
- Smart serialised sensors holds calibration data internally. This means that sensor can be interchanged between handheld meters without the requirement to be calibrated.
- Technical Specifications similar to Aqua22 but no data point saving.

Dissolved Oxygen Measurement

- Uses standard Royce G95A online DO sensor
- Proven galvanic technology
- Accurate at zero DO
- Supplied with three years consumables
- Repeatability is +- 1% at constant temperature
- Response time <30 seconds
- Cable length 5 metres

pH Measurement

- Uses standard Royce S400 online pH sensor
- Sealed double junction reference
- Flat bulb design prevents glass breakage
- Range is 0 -14pH
- Supplied with 4pH and 7pH buffer solution
- Cable length 5 metres

ORP Measurement

- Uses standard Royce S400 online ORP sensor
- Guarded bulb design prevents glass breakage
- Range is -1000mV to +1000mV
- Supplied with 239mV buffer solution
- Cable length 5 metres

Level Measurement

- Depth - 0 to10 metres
- Cable length 10 metres
- A hydrostatic level sensor is used to provide easy depth measurement of tanks, ponds etc.

Sludge Watch 715

Portable Sludge Blanket Detector

Benefits

- Reliable, repeatable measurement
- Not operator dependent
- Improved tank desludging
- No user adjustment required
- Cable management
- Uses standard 9V battery

Applications

- Sewage treatment: final tanks and primary tanks
- Water treatment - clarifiers and thickens
- Lamella separators

The Sludge Watch 715 provides a simple, low cost method of spot checking the sludge blanket level in a wide variety of settlement tanks. The cable reel design removes the need for any additional carrying bag.

The Sludge Watch 715 uses a range of infrared sensors to make the sludge interface detection. Infrared attenuation has been selected as it is ideally suited to detecting the sludge present in the interface zone. This tends to be considerably 'thinner' than the sludge that is present at the bottom of a settlement tank.

This method of sludge blanket detection offers major improvement over traditional Sludge Judge type systems in terms of both repeatability and importantly health and safety - no more manhandling 4 metre tubes full of contaminated wastewater.

Technical Specifications

Dimensions	280 x 230 x 130mm
Weight	1.7kg including sensor and 10 metres
Protection Class	Electronics: IP54 Sensor: IP68 Sensor: IP68
Enclosure Material	Dark Blue Nylon
Cable Length	10 metres standard, 15 metres maximum
Power Supply	9V Battery (PP3)
Battery Life	6 months typical use
Operating Temperature	0 to 50°C, limited by risk of ice formation interfering with measurement
Display	Front Panel LED - 'ON' in Sludge
Audible Output	Short Tone in Water Long Tone in Sludge
Accuracy	+/- 1 cm of interface
Principal of Operation	Light Attenuation
Wavelength	960nm Infrared
Resolution	Standard cable markings every 1.0 metres
Units of Measurement	Metres
Response Time	0.5 seconds

750w² Portable Monitor

Portable MLSS & Dissolved Oxygen Meter

The 750w² portable monitor makes it easy to gather and record data on water quality parameters. Using high-quality cable connectors to connect a variety of interchangeable water quality sensors, including TSS, dissolved oxygen and temperature.

Simple, robust & accurate

- The 750w² handheld water quality monitor gathers data in real-time making it easy to check online systems or monitor operations when no online output is available.
- The rugged unit has a built-in data recorder for storing a minimum of 500 data points per sensor.

Market Leader

- The monitor's easy-to-use interface, multiple sensor options and a field-ready design makes the 750w² the market leader for on-site monitoring of TSS, Turbidity, Sludge Level and Dissolved Oxygen.
- Four choices of TSS sensor provide the flexibility and accuracy required for TSS measurement in different applications.

Self-Linking Sensors

- The Partech 750w² Portable Monitor is designed for simplicity. Connected sensors are discovered automatically and readings are displayed immediately.

Onboard Calibration Assistant

- Step by step calibration assistance simplifies in-field operations.

Easy Data Collection

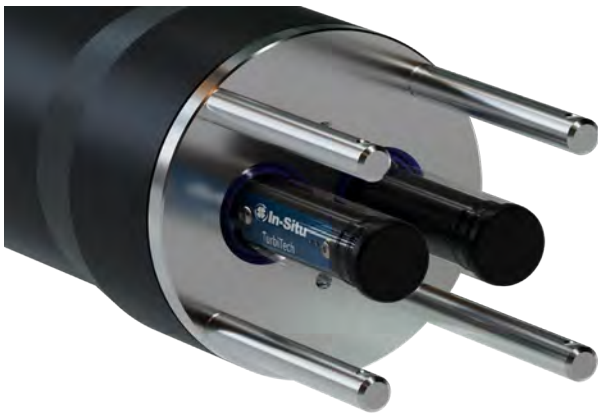
- No software, internet or wireless connection needed. Data is stored on the device for later use.

Multi-Site Capable

- Up to 10 specific TSS calibrations are supported, allowing the same sensor to be used across multiple locations.

Technical Specifications

Dimensions	220mm(8.6")x110mm(4.3") x39mm(1.5")(HxWxD)
Weight	0.75 kg (1.65 lbs)
Protection Class	IP65
Enclosure Material	ABS
Cable Connection	4 Way Circular Plug - For Sensor 5 Way Circular Plug - For Charger
Power Source	Internal Rechargeable Battery Pack
Battery Life	Sufficient for 1 week normal use (30 measurements per day), under normal operating conditions, e.g. normal, contrast and brightness settings.
Operating Temperature	0 to 60°C (32 to 140°F)
Display	Sunlight-readable graphical LCD
Setup	Via 7-button membrane keypad
Data Recorder	Minimum 500 points per sensor, actual capacity will depend on configuration.
Interface to PC	USB cable for data download



TurbiTech UVT Sensor

Total Suspended Solids Sensor

The TurbiTech UVT sensor uses light absorbance technology to measure UV transmittance, making it ideal for monitoring and controlling UV disinfection in wastewater treatment. It can also be configured to estimate Total Suspended Solids (TSS) using dual-wavelength optics that enhance detection of both organic and inorganic solids. Its built-in cleaning system scrapes debris from the optics without the need for compressors or pressurized water, requiring only periodic seal replacement every two years for maintenance.

Built for durability and ease of use, the TurbiTech UVT features a titanium connector, impact-resistant housing, and scratch-resistant quartz probes protected by metal guards during deployment. The sensor integrates seamlessly with In-Situ's RuggedCable® system and 7300 monitor, which auto-detects the device for quick setup. The Twist-Lock cable connector enables the quick release of the instrument for sensor maintenance or swapping, without requiring unwiring or cable reinstallation.

FEATURES

RADIAL CLEANING

TurbiTech's unique optical cleaning system continuously maintains sensor performance by actively scraping grime from the optics and preventing fouling between readings. Designed for ease of use, the system features user-replaceable seals and scrapers, enabling quick, in-field maintenance without the need for additional equipment such as compressors or pressurized water.

ENHANCED RELIABILITY

Built for durability and long-term performance, TurbiTech UVT features

- Waterproof twist-lock metal connectors that offer significantly longer life than plastic alternatives.
- Sensor housing made from machined, impact-resistant plastic to enhance durability and chemical compatibility.
- Titanium rods that safeguard the quartz optical rods, which are highly resistant to scratching and surface damage.

LOW COST OF OWNERSHIP

The system supports long operational cycles, with recommended seal replacement every 3,600 cleaning cycles. This typically equates to about two years in wastewater applications and approximately three years in drinking water environments.

INTEGRATED SOLUTION

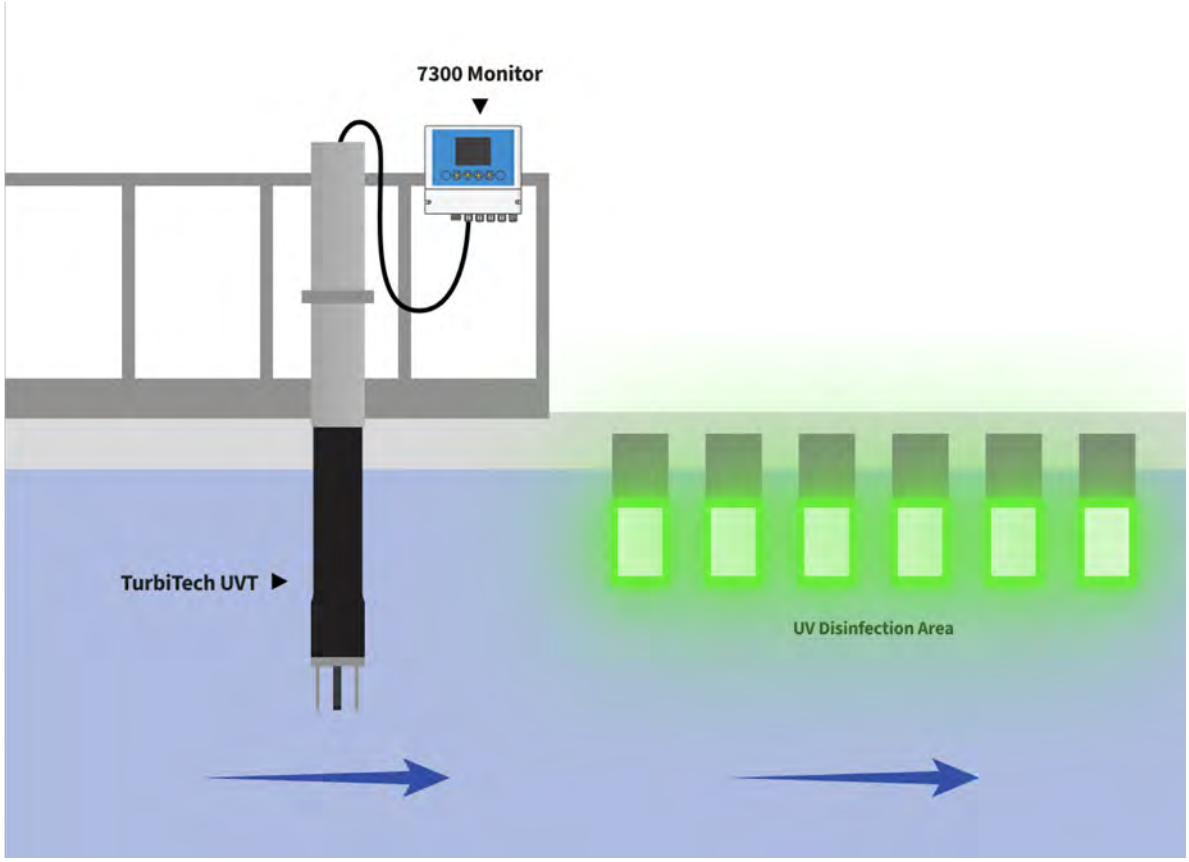
The TurbiTech UVT is part of a complete digital portfolio of process sensors, which connect to the 7300 monitor, to log, display and transmit data to the plant SCADA system.

EASY INSTALLATION

The TurbiTech UVT can be supplied with a FlexTech mounting shaft and bracket for easy installation on a handrail or wall at the point of monitoring. The instrument can also be used with the FC8 Flow Cell, or even threaded into a custom mounting solution.

TWIST-LOCK QUICK RELEASE CABLE

In-Situ's rugged IP68 Twist-Lock cables are designed for convenience and flexibility, with a universal connection that allows seamless swapping between standalone probes and multiparameter instruments, simplifying fieldwork, reducing system costs, and eliminating the need to purchase or install new cables.



The TurbiTech UVT has a large sample area volume which minimises the effect of small debris on the reading accuracy. Additionally, by avoiding the use of epoxy as a primary seal, the design ensures greater reliability in field conditions.

APPLICATIONS

- Wastewater UV Disinfection
- Raw Water Intake

Technical Specifications

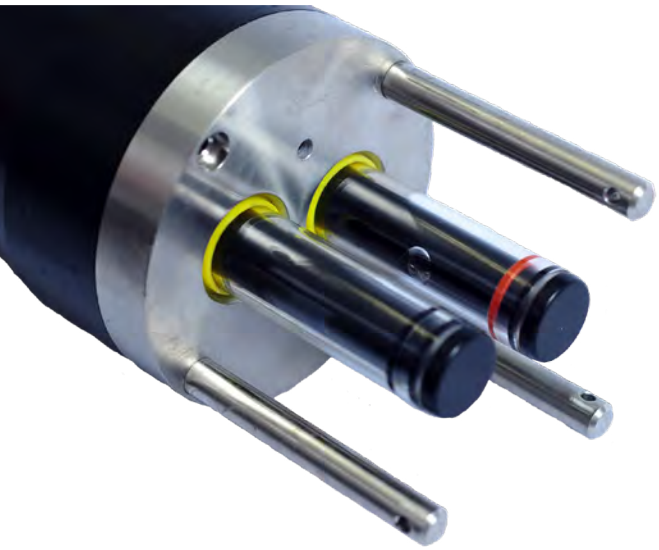
GENERAL	TURBITECH UVT
Operating Temperature	-5 to 50°C (non-freezing)
Storage Temperature	-40 to 65°C
Dimensions	Length: 397 mm Maximum Diameter: 80 mm
Weight	1.59 kg
Max Pressure Rating	1 bar (14.5 psi)
Communication Options	Modbus RS485
Environmental Rating	IP67 without cable installed, IP68 up to 1m with cable installed
External Power	8-36 VDC
Communication Device	7300 Monitor
Cable Options	In-Situ Rugged Cable
Software Support	7300 Monitor Interface
UVT PARAMETER	
Range	0.00-100.00 % T
Units of Measurement	% T
TSS PARAMETER	
Accuracy	±5% of reading or ±100 mg/L TSS whichever is greater
Range	0-20,000 mg/L
Units of Measurement	ppb, ppm, µg/L, mg/L, g/L, %

TurbiTechw² HR

High Range Suspended Solids Sensor

The TurbiTechw² HR Sensor has been specifically designed for use in wastewater treatment systems where high levels of suspended solids are desirable in the aeration phase. Membrane Batch reactors typically run with MLSS values in the region of 8,000 to14,000 mg/l. MLSS concentrations promote numerous process benefits, including stable operation, complete nitrification, and reduced biosolids production reducing biological volume requirements (and associated footprint) to only 20-30 percent of conventional processes. Further, the membrane tanks provide extremely space efficient solids separation and do not require a clarifier in the system.

The TurbiTechw² HR Sensor is suitable for monitoring solids in higher ranges than the standard LA version of the sensor due to it's shorter path length. The large optical surface and sample volume combine to ensure that the sensor is providing information that is reliable and representative of the solids present in the process. Deposits of fats and grease on the sensing area do not prevent the sensor from measuring unlike sensors with small optical surfaces.



Benefits
- Automated Aeration Control
- Low Cost of Ownership

Features:
- Fully automatic Self Cleaning
- Flexible Mounting System
- Large Optical Surface

Applications:
- Membrane Batch Reactors
- Mixed Liquor
- Returned Activated Sludge

TurbiTechw² LA

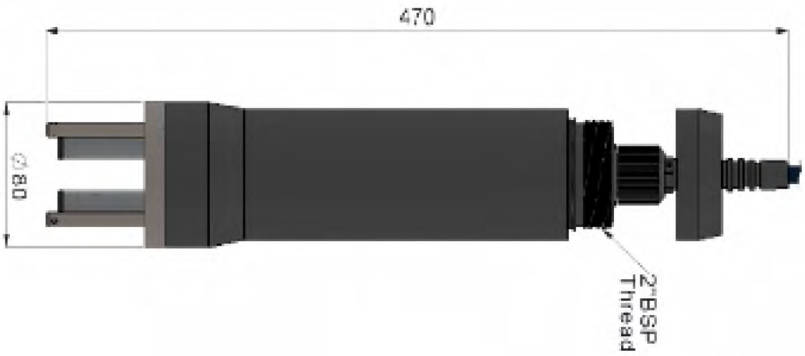
Medium Range Suspended Solids Sensor

The TurbiTechw² LA Sensor has been designed for use in aeration systems monitoring suspended solids also known as mixed liquor suspended solids or activated sludge where solids are typically in the range of 1,500 to 3,500mg/l.

The sensor can also measure Returned Activated Sludge (RAS), Surplus Activated Sludge (SAS) and suspended solids turbidity. The fully automatic self cleaning system that manual intervention on routine is not required.

Benefits & Features:
- Same as TurbiTechw² HR

Applications:
- Mixed Liquor
- Aeration Basin
- Oxidation Ditch
- Returned Activated Sludge
- Surplus Activated Sludge



TurbiTechw² D-ISO

Turbidity Sensor

Building on the success of the TurbiTechw² LR sensor and by continually striving to improve and expand our product range Partech is proud to introduce the new TurbiTechw² D-ISO sensor. The D-ISO is a natural evolution in terms of development and offers our customers an improved user experience in all areas.

The TurbiTechw² D-ISO was developed using valuable feedback from existing customers and incorporates that feedback into it's use and function. It uses 40 years of sensor design to produce a new sensor that captures stray light to ensure a stable zero point. A new automatic self cleaning mechanism that prevents the build up of fouling in and around the chamber making this the bench mark for low range turbidity. It's an extremely sensitive sensor can detect changes in Turbidity of less than 0.01 NTU. It's global standard of light scatter technique makes the sensor sensitive to a wider range of particle sizes.

Features:

- Dry Secondary Standard
- Ultra Low Back Scatter
- Auto-Clean Sensor

Applications:

- Raw Water
- Process Control
- Final Water Monitoring
- Filtered Water
- Filter Backwash Control
- Clarifier Supernatant

ColTechw² Sensor

Colour Sensor

The ColTechw² Sensor has been specifically designed to monitor Apparent Colour in applications where a broad indication of the colour of the water is required. Organic materials such as Humic Acid or metals like Iron and Manganese dissolved in water will appear as an unacceptable yellow tinge. If discoloured water is allowed to enter the water supply network customers will quickly become aware of the problem.

Measurement of colour is therefore an important element of potable water treatment control, the ColTechw² Sensor in combination with the 7300w² Monitor will provide a reliable, repeatable indication of colour levels allowing online adjustment of coagulation control packages. A high residual colour reading is a clear indicator of a coagulation control system that is not functioning correctly, and will allow the process to be optimised enabling significant savings to be made in usage of dosing chemicals.

Features:

- Auto-Clean Sensor

Applications:

- Raw Water
- Filtered Water
- Filter Backwash Control
- Clarifier Supernatant
- Process Control

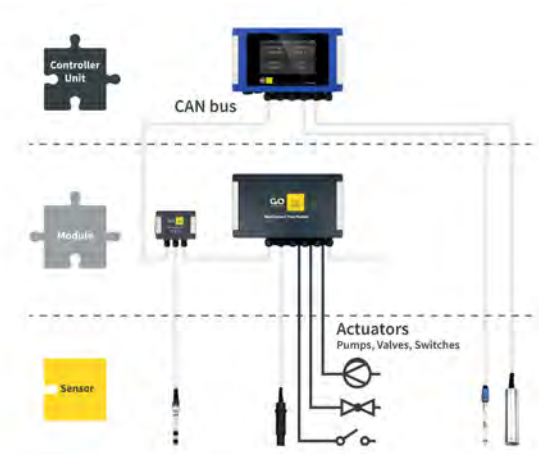
Multifunction Controller R1

The BlueBox R1 Controller is a modular and expandable base for monitoring and control tasks of all dimensions. It allows the management of extensive sensor and actuator networks.

With the help of the BlueBox as a central interface, the integration and connection of further systems can easily be accomplished. A connection via internet or mobile networks facilitates the transmission of measurement data and results at any time and allows for remote access and control of the system.

The BlueBox System

The compatibility of the BlueBox System allows to easily set up complex measurement networks. Individual components can easily be linked via a fieldbus connection and allow for the expansion of the system. So, whether you have only one measurement point or a whole grid of measurement points - the BlueBox is the solution!



Functions & Features:

- Monitoring Function
- Control Function (PLC)
- Plug & Play (Smart Sensor)
- Remote Access Control
- Intelligent Event Handling
- Cloud Data Service
- Modular & Expandable
- CAN bus & Modbus

Technical Specifications

Power Supply	24 V DC
Power consumption (typical)	5 W
Dimensions (wxhxd)	330 x 220 x 93 mm
Weight	approx. 3 kg
IP protection class	IP 65
Memory	8 GB
Colour Touch Display	7 inch
Ambient temperature	-20 to +45 °C

BlueConnect Module

Digitisation of standard process sensors in your water or wastewater treatment plant

The BlueConnect module enables the conversion of standard analogue sensors into the digital world. In addition to the simple connection of sensors to the BlueBox system via CAN bus, sensors can also be integrated directly into a PLC via Modbus. The necessary protocol is freely available and all necessary settings can be configured via the associated free of charge PC software.

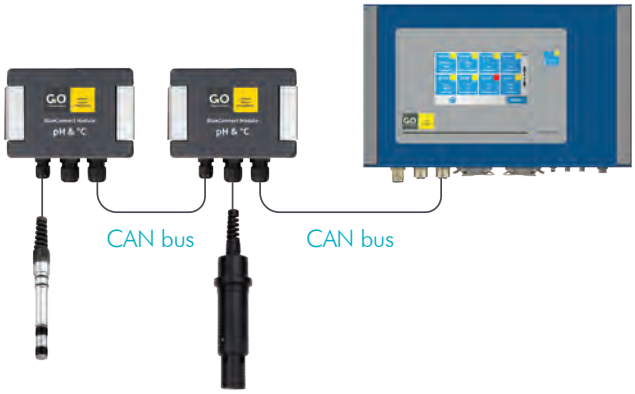
This means that Water and Wastewater Treatment Plants are no longer restricted to Vendor Proprietary Systems when integrating various Vendor Sensors to Instruments, PLC's and other Control Systems.

For example, a standard pH or DO Sensor can be connected to a small BlueConnect Module and the Output signal sent via Modbus direct to the PLC or other Supervisory Control System.

Alternatively, the BlueConnect can send a CAN bus signal direct to a Royce GO BlueBox Analyser/ Controller which accepts up to 200 Inputs.

Currently available Sensor Inputs for BlueConnect are:

- Analogue pH with/without Temperature (LTH S410)
- Analogue ISE (NH4 or NO3)
- Analogue Redox / ORP (LTH S400)
- Galvanic Dissolved Oxygen (Royce G95A)
- Selective Turbidity (B&C TU8325)
- Selective MLSS (B&C TU8355)
- Selective EC (GO SYS)



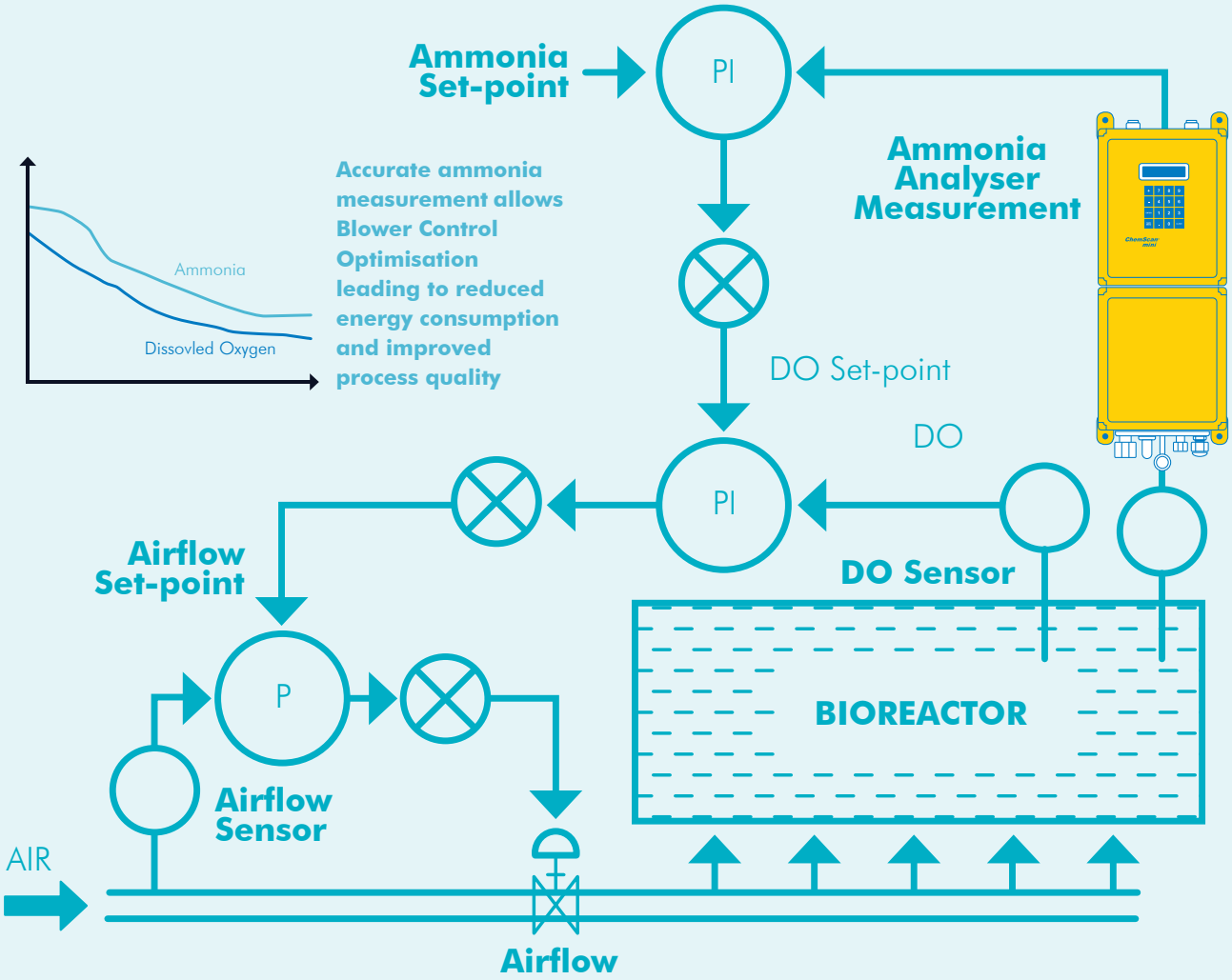
Digitisation of analogue sensors:

The BlueConnect module effortlessly brings an analogue sensor into the digital world. Once the sensor has been connected, the converted data can be read out via Modbus RTU (RS485). The associated protocol is freely available, enabling a direct connection to a PLC or a Modbus master. If a sensor is used that must be calibrated at certain intervals, the BlueConnect can be connected to a laptop and calibrated with the associated free of charge PC software.

Functions & Features

CANBUS/MODBUS INTERFACE | SENSOR INPUT | PLUG & PLAY SMART SENSOR | DIGITISATION OF SENSORS | IP 66 WEATHERPROOF | PLC INTEGRATION | OPEN PROTOCOL | COMPACT DESIGN

Accurate Ammonia Measurement



Water & Wastewater Monitoring

Royce Water Technologies also offers the ChemScan mini for single-parameter, single-sample line analysis - parameters include: Ortho Phosphate, UV254 Percent Transmittance, Ammonia, Manganese, Chlorine, Sulfite, Monochloramine and Free Ammonia.

Mini LowAm

Ammonia analyser

The single parameter in-line analyser family from ChemScan® utilises years of experience and proven technology to provide reliable and accurate analysis of water and waste water.

This device has been designed from the ground up to reduce maintenance requirements, includes large ID sample tubing to minimise plugging and only needs quarterly reagent refills.

Features

- Automatic Analysis Utilising ChemScan's Proprietary Method
- Low Maintenance
- Proven Sample Handling with Large I.D. Flow Paths
- Simple Field Adjustable Calibration
- Sample Blank to Eliminate Background Interference
- Automatic Cleaning

Benefits

- High Reliability
- Low Capital Cost
- High Accuracy
- Low Operating Cost

Capabilities

- Automatic Analysis
- Continuous Output
- Multiple Data Communication Interface Options

Applications

- Wastewater Effluent
- Wastewater Bioreactor

Technical Specifications

Range	0.1 - 10.0 mg/L (ppm)
Accuracy	2% of value or 2x detection limit (whichever greater)
Cycle Time	10 minutes to 9999 minutes (field programmable)
Environment	5 - 50 degrees C (method dependent)
Power	100 - 240 VAC, 50 W
Enclosure	NEMA 4x
Safety Approval	CSA-US
Sample Requirements	<150 mg/L TSS, <60 NTU >150mg/L use Royce Wand Filter
Maintenance	Reagent replacement every 3 months, pump kit yearly
Relay Contacts	1 SPDT Concentration, 1 SPDT Programmable
Serial Interface	RS-232 Maintenance Port
Analog Output	Isolated 4-20 mA

Mini UV254

% Transmittance analyser

The new single parameter in-line analyser family from ChemScan® utilises years of experience and proven technology to provide reliable and accurate analysis of water and waste water. This device has been designed from the ground up to reduce maintenance requirements, includes large ID sample tubing to minimise plugging.

Features

- UV-LED Light Source
- Low Maintenance
- Automatic Zeroing and Cleaning
- Proven Sample Handling with Large I.D. Flow Paths
- Simple Field Adjustable Calibration
- Direct Photodiode Detection
- Temperature Stabilised Light
- Source and Detector
- Sealed Electronics Enclosure
- Sealed Flow Cell

Benefits

- High Reliability
- Low Capital Cost
- High Accuracy
- Low Operating Cost

Capabilities

- Continuous, Real Time Analysis of Constant Flow Sample Stream
- Isolated Analog Output
- High and Low Alarms
- Diagnostic Alarms
- LED Digital Display
- Universal AC Power Options
- Data Log

Applications

- Municipal Water and Wastewater
- Industrial Water and Wastewater

Technical Specifications

Range	1.0 - 100% T, 0.0 - 2.0 AU
Accuracy	2% of value or 2x detection limit (whichever greater)
Cycle Time	Continuous
Environment	5 - 50 degrees C (method dependent)
Power	100 - 240 VAC, 50 W
Enclosure	NEMA 4x
Safety Approval	CSA-US
Sample Requirements	5 - 20 psi
Maintenance	Monthly replenish zero/clean solution
Relay Contacts	1 SPDT Concentration, 1 SPDT Programmable
Serial Interface	RS-232 Maintenance Port
Analog Output	Isolated 4-20 mA

ChemScan
An In-Situ Brand

Mini oP

Ortho-phosphate analyser

The single parameter in-line analyser family from ChemScan® utilises years of experience and proven technology to provide reliable and accurate analysis of water and waste water. This device has been designed from the ground up to reduce maintenance requirements, includes large ID sample tubing to minimise plugging and only needs quarterly reagent refills.

Features

- Automatic Analysis Utilising ChemScan's Proven VMo Method
- Low Maintenance
- Proven Sample Handling with Large I.D. Flow Paths
- Simple Field Adjustable Calibration
- Sample Blank to Eliminate Background Interference
- Automatic Cleaning

Benefits

- High Reliability
- Low Capital Cost
- High Accuracy
- Low Operating Cost
- EPA Recognised Analysis Method

Capabilities

- Automatic Analysis
- Continuous Output
- Multiple Data Communication
- Interface Options

Applications

- Portable Water
- Waste Water Effluent
- Wastewater Inlet

Technical Specifications

Range (as PO4)	0.09 - 9.0 mg/L (ppm) (Std), 0.3 - 18.0 ppm
Range (as PO4 - P)	0.03 - 3.0 mg/L (ppm) (Std), 0.1 - 6.0 ppm
Accuracy	2% of value or 2x detection limit (whichever greater)
Cycle Time	5 minutes to 9999 minutes (field programmable)
Environment	5 - 50 degrees C (method dependent)
Power	100 - 240 VAC, 50 W
Enclosure	NEMA 4x
Safety Approval	CSA-US
Sample Requirements	0.5 - 1 Liter/analysis, pressure 5 ft to 10 psi, <150 mg/L TSS, <60 NTU
Maintenance	Reagent replacement every 3 months, pump kit yearly
Relay Contacts	1 SPDT Concentration, 1 SPDT Programmable
Serial Interface	Serial, RS-232 Maintenance Port
Analog Output	Isolated 4-20 mA

Mini Mn

Manganese analyser

The new single parameter in-line analyser family from ChemScan® utilises years of experience and proven technology to provide reliable and accurate analysis of water and waste water. This device has been designed from the ground up to reduce maintenance requirements, includes large ID sample tubing to minimise plugging and only needs quarterly reagent refills.

Features

- Automatic Analysis Utilising Proven Formaldoxime Method
- Low Maintenance
- Proven Sample Handling with Large I.D. Flow Paths
- Simple Field Adjustable
- Calibration
- Sample Blank to Eliminate Backgound Interference
- Automatic Cleaning

Benefits

- High Reliability
- Low Capital Cost
- High Accuracy
- Low Operating Cost

Capabilities

- Automatic Analysis
- Continuous Output
- Multiple Data Communication Interface Options

Applications

- Potable Water
- Wastewater Effluent

Technical Specifications

Range	0.002 - 8.0 mg/L
Accuracy	2% of value or 2x detection limit (whichever greater)
Cycle Time	5 minutes to 9999 minutes (field programmable)
Environment	5 - 50 degrees C (method dependent)
Power	100 - 240 VAC, 50 W
Enclosure	NEMA 4x
Safety Approval	CSA-US
Sample Requirements	0.5 - 1 Liter/analysis, pressure 2 to 10 psi, <150 mg/L TSS, <60 NTU
Maintenance	Reagent replacement every 3 months, pump kit yearly
Relay Contacts	1 SPDT Concentration, 1 SPDT Programmable
Serial Interface	RS-232 Maintenance Port
Analog Output	Isolated 4-20 mA

Mini Mono & FreeAm

Monochloramine analyser

The single parameter in-line analyser family from ChemScan® utilises years of experience and proven technology to provide reliable and accurate analysis of water and waste water.

This device has been designed from the ground up to reduce maintenance requirements, includes large ID sample tubing to minimise plugging and only needs quarterly reagent refills.

Features

- Automatic Analysis Utilising Proven Method
- Low Maintenance
- Proven Sample Handling with Large I.D. Flow Paths
- Simple Field Adjustable Calibration
- Sample Blank to Eliminate Backgound Interference
- Automatic Cleaning

Benefits

- High Reliability
- Low Capital Cost
- High Accuracy
- Low Operating Cost

Capabilities

- Automatic Analysis
- Continuous Output
- Multiple Data Communication Interface Options

Applications

- Potable Water
- Wastewater Effluent

Technical Specifications

Range	0.02 - 10.0 mg/L (ppm)
Accuracy	5% of value or 2x detection limit (whichever is greater)
Cycle Time	5 minutes to 9999 minutes (field programmable)
Environment	5 - 50 degrees C (method dependent)
Power	100 - 240 VAC, 50 W
Enclosure	NEMA 4x
Safety Approval	CSA-US
Sample Requirements	0.5 - 1 Liter/analysis, pressure 2 to 10 psi, <150 mg/L TSS, <60 NTU
Maintenance	Reagent replacement every 3 months, pump kit yearly
Relay Contacts	1 SPDT Concentration, 1 SPDT Programmable
Serial Interface	RS-232 Maintenance Port
Analog Output	Isolated 4-20 mA

Mini LowChlor

Low Chlorine Analyser

The ChemScan mini LowChlor analyzer provides operators with reliable process chemistry measurements. The analyzer data ensures proper control of chlorination treatment processes. This reduces the need for frequent manual sampling or laboratory analysis while producing the best water quality.

Features

- Unique sample line cleaning minimizes biological interferences
- Robust design for demanding operating environments
- Blockage resistant internal sample tubing
- No filtration required on samples with low solids
- Minimal replacement parts for low maintenance
- Sample Blank eliminates electrical/optical drift
- Simple field adjustable calibration
- Separate enclosures for electronic and sample handling
- LED Light source for 10+ years design life
- Self-Cleaning to eliminate internal fouling
- Separate external sample line cleaning available
- Full range of sampling accessories available for all applications

Benefits

- Assure process conformance
- Control energy and chemical costs
- Confirm plant compliance in real-time
- Improve process performance
- Low reagent and maintenance costs

Applications

- Analysis of LowChlor in potable water, wastewater and industrial processes

Technical Specifications

Range	Method 1030 0.005 - 2.0 mg/L
Accuracy	2% of value or 2x detection limit (whichever is greater) Per EPA SP 846 (The detection limit is the low concentration stated in ranges below)
Response Time	4 minutes minimum
Environment	5° - 45°C (Indoor or Sheltered)
Power	120-240 VAC ±10%, 50-60 Hz, 70 VA
Enclosure	Upper Enclosure: NEMA 4X Fiberglass Reinforced Polyester, Acrylic window Lower Enclosure NEMA 4X Fiberglass Reinforced Polyester
Sample Temperature	10° - 60°C
Sample Pressure	Pressurised sample line required regulated to 2-10 psi (15-70 kPa), (sample conditioning and pressurizing accessories available)
Maintenance	Auto clean
Data Communications	4-20 mA (2 outputs)
Size	26" tall x 9.5" wide x 7" deep (66 cm tall x 24 cm wide x 18 cm deep)
Weight	27 lbs (12.25 kg)

ChemScan
An In-Situ Brand

Mini ChlorAm

Chloramination Analyser

The ChemScan mini ChlorAm Chloramination Analyzer provides operators with timely process chemistry measurements to optimize the challenging chloramination process. The analyzer provides data to ensure proper disinfectant while minimizing disinfection by-products (DBPs) and nitrification potential in drinking water distrubution systems. This reduces the need for frequent manual sampling or laboratory analysis while producing the best water quality. The mini ChlorAm Analyzer is well suited for drinking water and wastewater chloramination applications.

The mini ChlorAm Analyzer monitors multiple parameters in the Chloramination process; Monochloramine, Total Ammonia, and Free Ammonia, while calculating the Cl2:N ratio.

The analyzer utilizes 15 years of ChemScan Chloramination experience and proven technology. Unlike other analyzers, no mandatory service contract is required.

Features

- Low maintenance
- Proven sample handling with large sample lines to minimize blocking
- Easy to maintain with intuitive sample flow
- Components are designed for easy accessibility
- Integrated self cleaning to remove buildup in flow cell and sample lines
- Simplified analysis cycle reduces the number of moving parts
- Field analysis utilizing proven methods
- Sample blank to eliminate background interference
- Simple field adjustable calibration

Benefits

- Reliable chloramination process control to minimize DBP's
- Miminized dichloramine to reduce taste and odour complaints
- Reduced need for frequent laboratory analysis
- Lowest capital and operational cost
- No service contract required
- Automatic Analysis
- Continuous Output
- Multiple Data Communication Interface Options
- Wastewater Effluent

Technical Specifications

Range	Monochloramine 0.02 - 5.00 mg/L Total Ammonia 0.02 - 3.00 mg/L Free Ammonia 0.025 - 2.00 Mg/L Cl2:NH3-N Ratio 0-25
Accuracy	2% of value or 2x detection limit (whichever is greater)
Response Time	19 minutes with 9 minute updates
Environment	5° - 45°C (Temperature-Controlled Oudoor Enclosure Optional
Power	120-240 VAC ±10%, 50-60 Hz, 70 VA
Enclosure	Upper Enclosure: NEMA 4X (Fiberglass Reinforced Plastic) Polyester, Acrylic window. Lower Enclosure NEMA 4X (Fiberglass Reinforced Plastic) Polyester
Sample Temperature	10° - 60°C
Sample Pressure	Pressurised Sample Line Required Regulated to 2-10 psi (15-70 kPa), (For wastewater, sample extraction accessory available – Pump and Sample Circulation Loop Assembly)
Maintenance	Automatic Flow Cell and Sample Line Cleaning
Data Communications	4-20 mA (4 outputs)
Size	26" tall x 9.5" wide x 7" deep (66 cm tall x 24 cm wide x 18 cm deep)
Weight	27 lbs (12.25 kg)

Chemscan UV 4200 Nutrient Analyser

The ChemScan UV-4200 Analyzer provides operators with timely process chemistry measurements. The analyzer provides data to ensure proper control of nutrient, disinfection and other dissolved chemical treatment processes. This reduces the need for frequent manual sampling or laboratory analysis while producing the best water quality.

The ChemScan UV-4200 is equipped with a Graphic User Interface built to handle the challenges of a municipal/industrial environment. The display simplifies navigation making the analyzer user friendly. Large display numbers allow the operator to view current parameter values at a glance and maintenance and troubleshooting videos can be accessed and viewed on the display.

ChemScan Features

- Simple to use and maintain
- Designed for the harsh in-plant operation environment
- Reagent-assisted, multiple-wavelength UV absorbance technology ensures accuracy across varying water conditions
- Clog-proof, internal, multi-sample line manifold
- Automatic zero and cleaning eliminates electrical optical drift and flow cell fouling
- Benign, inexpensive reagents
- No ion-specific electrodes to clean or replace
- Multiple data communication options with plant SCADA
- Simple Wand filtration system drastically reducing maintenance and costs

Benefits

- Ensure process conformance
- Control energy and chemical costs
- Confirm plant compliance in real time
- Improve process performance
- > 100 Installations throughout Australia

Specifications:

Measurement Principle:

- Reagent-Assisted, Multiple-Wavelength UV Absorbance Technology Using Pattern Recognition of Spectral Data

Sample Lines:

- 2

Parameters and Range per Sample Line (custom range available):

- Nitrite 0.1 - 5.0 mg/l as N
- Nitrate 0.1 - 20.0 mg/l as N
- Ammonia 0.2 - 20.0 mg/l as N
- Ortho Phosphate 0.05 - 5.0 mg/l as P

Chemscan UV 2250/S Chloramination Analyser

The ChemScan UV-2250/S Chloramination Analyzer provides operators with timely process chemistry measurements to optimize the difficult-to-control chloramination process. The analyzer provides data to ensure proper disinfectant while minimizing disinfection by-products (DBPs) and nitrification potential. This reduces the need for frequent manual sampling or laboratory analysis while producing the best water quality.

The ChemScan UV-2250/S is equipped with a Graphic User Interface built to handle the challenges of a municipal/industrial environment. The display simplifies navigation making the analyzer user friendly. Large display numbers allow the operator to view current parameter values at a glance. And maintenance and troubleshooting videos can be accessed and viewed on the display.

ChemScan Features:

- Simple to use and maintain
- Designed for the harsh in-plant operating environment
- Reagent-assisted, multiple-wavelength UV absorbance technology ensures accuracy across varying water conditions
- Clog-proof, internal, multi-sample line manifold
- Automatic zero calibration and cleaning eliminates electrical optical drift and flow cell fouling
- Benign, inexpensive reagents
- No ion-specific electrodes to clean or replace
- Multiple data communication options with plant SCADA
- Simple Wand Filtration system drastically reducing maintenance and costs

Benefits:

- Ensures process conformance
- Controls energy and chemical costs
- Confirm plant compliance in real time
- Improve process performance
- Keep reagent and maintenance costs low
- >50 Installations throughout Australia

Specifications:

Measurement Principle:

- Reagent-Assisted, Multiple-Wavelength UV Absorbance Technology Using Pattern Recognition of Spectral Data

Sample Lines:

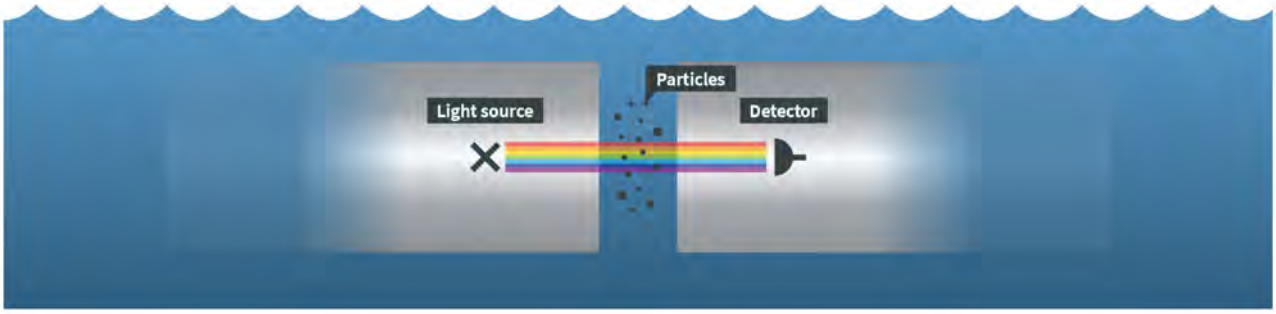
- 2

Parameters and Range per Sample Line (custom range available):

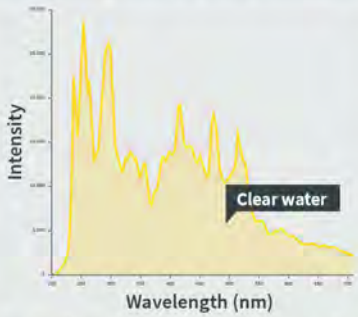
- Free Ammonia 0.02 - 1.00 mg/l as N
- Total Ammonia 0.02 - 2.00 mg/l as N
- Monochloramine 0.05 - 5.0 mg/l as Cl2
- Total Chlorine 0.05 - 5.0 mg/l as Cl2

Introduction to UV/Vis Spectrometry

When light radiates onto a medium - such as water - various effects such as reflection, scattering or absorption occur. Lambert-Beer's law states that the absorption of light at a certain wavelength depends on the concentration of the substance to be measured. UV/Vis spectrometers make use of this effect. Light with wavelengths in the UV and visual range radiates onto the medium, hence the name UV/Vis spectrometry. The substances in the water absorb light of different wavelengths and with different intensity. The remaining light is measured by a detector. The specific absorption per wavelength can then be used to calculate the concentration.

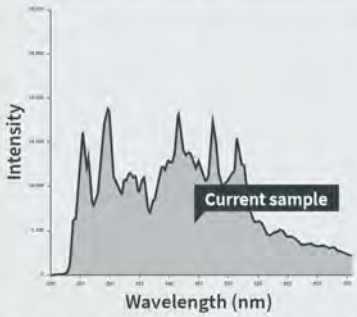


Clear Water Calibration



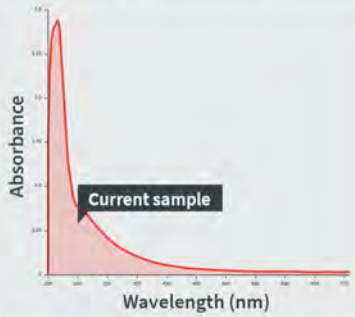
In order to correctly determine the absorption in water, a reference must first be defined. For this purpose, the intensity of the emitted light is recorded for the entire wavelengths in clear water. In order to calculate the ingredients correctly later on, double-distilled water should be used if possible. The clear water spectrum is stored as reference intensity I_0.

Current Raw Spectrum



With each measurement, the detector measures the remaining light that has not been absorbed by the measuring medium. This spectrum is also known as the raw spectrum and is stored as intensity I.

Absorption Spectrum



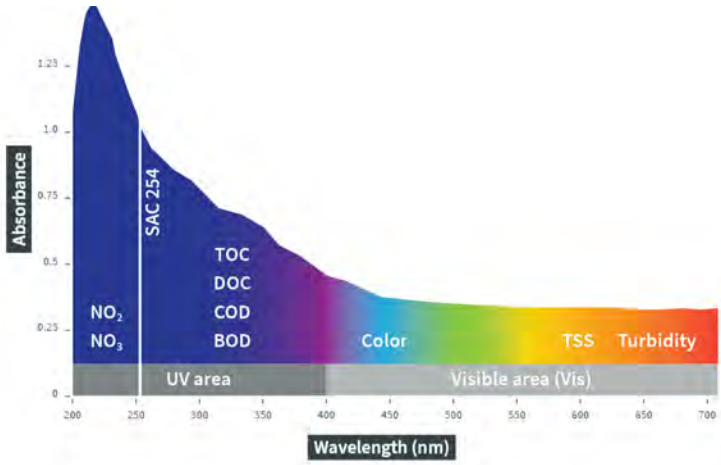
From the clear water calibration and the current raw spectrum, the absorption is finally calculated for each individual wavelength

$$A = lg(\frac{I_0}{I})$$

With the calculated values the whole absorption spectrum can be determined.

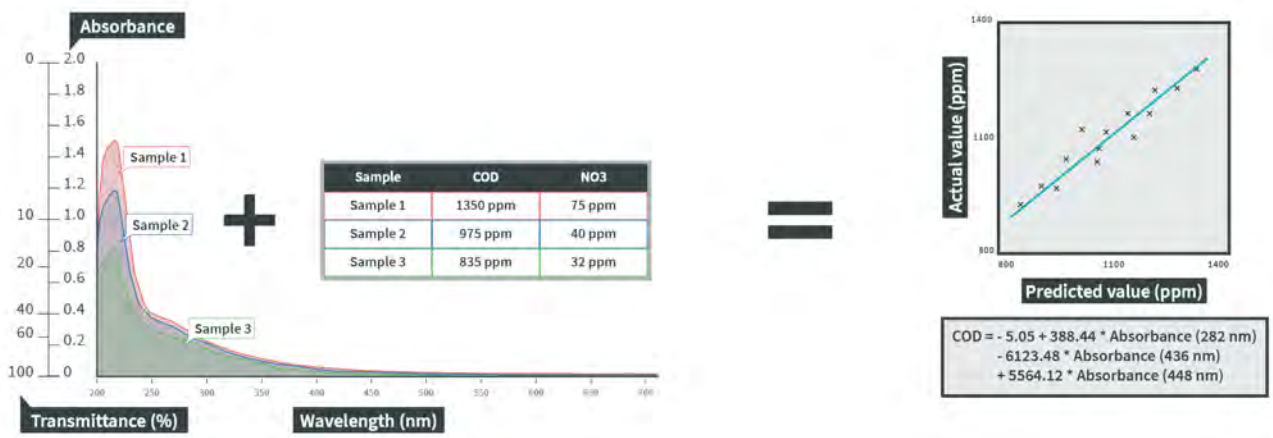
Possible parameters with UV/Vis spectrometers

With a UV/Vis spectrometer different parameters can be measured simultaneously. The best parameters for the measurement are, of course, those that have an absorption of light in the UV/Vis range. Nitrate or COD values, for example, are often determined. However, other parameters that do not show any absorption themselves can also be detected under certain conditions. For a specific calibration, the concentration can also be determined as a function of the absorption of the entire water matrix and not on the basis of the absorption of the substance itself.



Specific calibration to various parameters

To calculate the concentration of individual parameters based on absorption, a specific calibration must be performed. For the calibration it is necessary to take reference samples from which the laboratory values and absorption spectra are determined. From this data, a chemometric model can then be used to create a formula for calculating the respective parameter. The more reference values are available for the calibration, the better measurement accuracy can be achieved with this formula. The variance of different concentrations also optimizes the calibration.



Parameters & Measurement Ranges - UV/Vis

The Intelligent Spectral Analyser (ISA) is a compact UV/Vis spectrometer that allows the simultaneous determination of a variety of parameters with a single optical sensor.

Parameter	Measurement Range*	Measurement Principle
Spectral Absorption Coefficient (SAC)	0.0 - 1,500 1/m	Absorption single wavelength (254 nm)
UV-Transmittance (UVT)	0 - 100 %	Absorption single wavelength (254 nm)
Biological Oxygen Demand (BOD)	0.0 - 15,000 mg/l	Absorption UV/Vis Spectrum (200 - 720 nm)
Chemical Oxygen Demand (COD)	0.0 - 25,000 mg/l	Absorption UV/Vis Spectrum (200 - 720 nm)
Total Organic Carbon (TOC)	0.0 - 25,000 mg/l	Absorption UV/Vis Spectrum (200 - 720 nm)
Dissolved Organic Carbon (DOC)	0.0 - 15,000 mg/l	Absorption UV/Vis Spectrum (200 - 720 nm)
Total Suspended Solids(TSS)	0.0 - 5,000 mg/l	Absorption UV/Vis Spectrum (200 - 720 nm)
Total Nitrogen (TN)	0.0 - 200 mg/l	Absorption UV/Vis Spectrum (200 - 720 nm)
Nitrate (NO3)	0.0 - 150 mg/l	Absorption UV/Vis Spectrum (200 - 720 nm)
Nitrite (N02)	0.0 - 75 mg/l	Absorption UV/Vis Spectrum (200 - 720 nm)
Color	0 - 500 Hazen	Absorption UV/Vis Spectrum (200 - 720 nm)
Turbidity	0 - 2,000 FNU	Absorption UV/Vis Spectrum (200 - 720 nm)
Ammonium (NH4)	5.0 - 100 mg/l	Absorption UV/Vis Spectrum (200 - 720 nm)
Orthophosphate	5.0 - 100 mg/l	Absorption UV/Vis Spectrum (200 - 720 nm)

Single wavelength:

The absorption of individual wavelengths can be calculated with a UV/Vis Spectrometer. Thereby, it is possible to directly determine parameters like SAC or UVT without the need for a calibration.

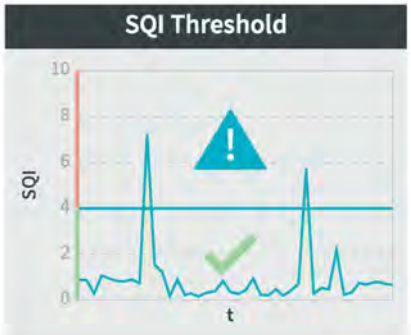
Absorption UV/Vis:

Moreover, the measurement of the absorption across the entire UV/Vis range allows to develop chemometric models. With the help of these models it is possible to simultaneously determine a multitude of parameters. The UV/Vis Spectrometers of GO Systemelektronik continuously monitor the quality of these models and ensure the reliability of calculation.

* The mentioned measurement ranges present typical upper and lower limits. The specific measurement ranges and achievable accuracies depend on the composition of the water and the quality of the reference samples.

Calibration Monitoring (SQI)

The Calibration Monitoring feature provides a real-time evaluation of the trustworthiness of measurement readings by means of a Spectral Quality Index (SQI). The SQI indicates how well the calibration fits to the current water matrix. The lower the SQI value the better the calibration will fit to the water matrix. A calibration with a SQI above the threshold value of 4 leads to a lower measurement accuracy. The feature enables the determination of the Validity of the Calibration and allows for the Automatic Selection of the most Suitable Calibration. With this unique feature for all of our UV/Vis Spectrometer Systems, it is possible to obtain an on-line quality detection of the spectrometer results and ensure the proper operability of the system.



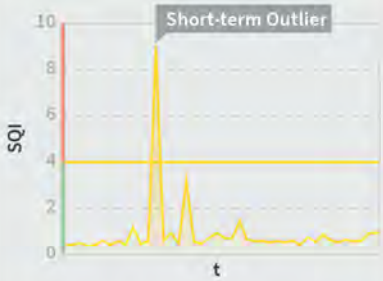
Available for the Following Products

- ISA - UV/Vis Spectrometer

Validity of the Calibration

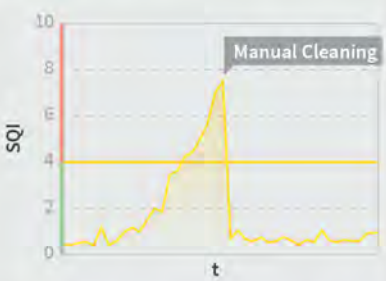
The SQI serves as a quality index that allows to determine how likely it is that the calibration is correct. Based on this information it is possible to distinguish between the occurrence of 3 potential cases and to assess whether action is required.

Short-term Measurement Error



A **temporary spike** in the SQI can occur as a result of **air or particles caught in the measurement path**. The Calibration Monitoring feature allows to effortlessly identify short-term outliers and gives the opportunity to ignore measurements exhibiting a higher SQI.

Contamination

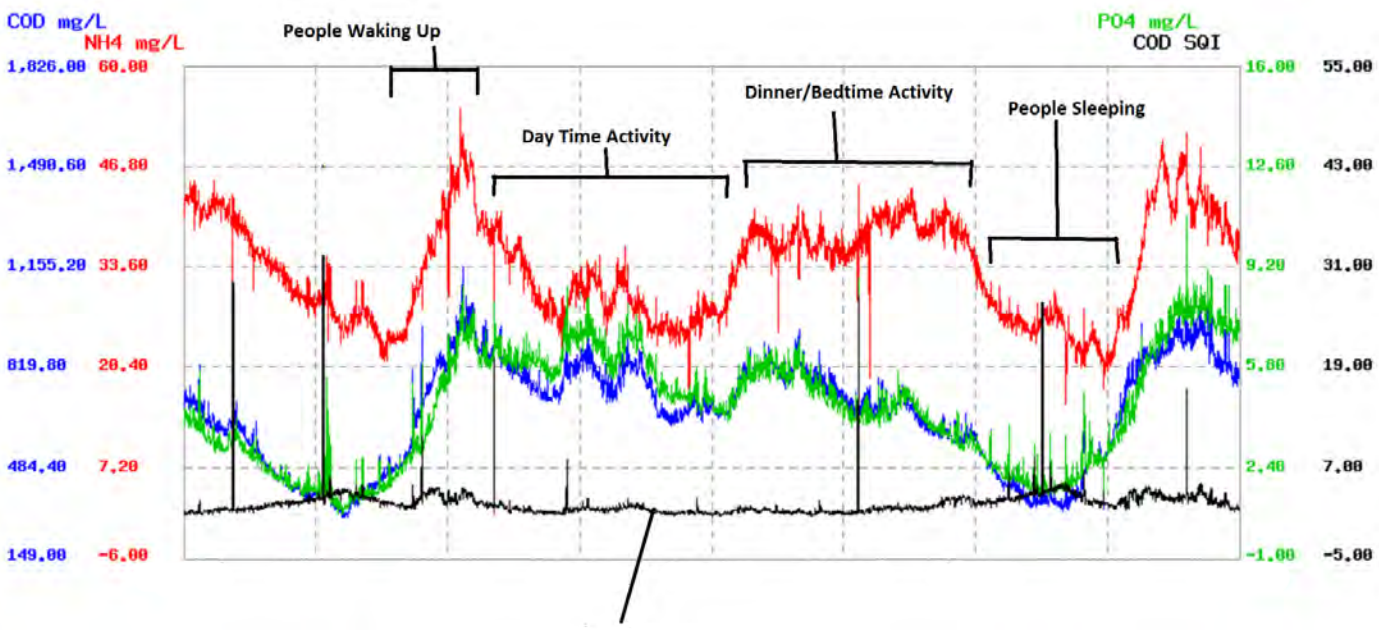


A **prolonged exceedance** of the SQI threshold value may be an indication for a **contamination of the measuring head**. In these instances, it is advisable to perform a **manual cleaning** of the measurement head. If the cleaning resolves the issue the SQI should drop back down to a lower level.

Changing Water Matrix

If the SQI remains at an elevated level, even after a **manual cleaning**, it may be an indication that the current calibration does not cover the water matrix anymore. The issue can be resolved either by **improving the existing calibration** through the **addition of reference values** or by **creating a new calibration**.

Influent Monitoring Using UV/Vis Spectrometer



SQI = Spectral Quality Index - compares current data confidence with original calibration data.
Lower SQI = Good Data
Higher SQI = Bad Data (Requires Cleaning)

NO_3	SAC	TSS	Phenol	PO_4	BOD5
TOC	COD	Glycol	NH_4	TN	TP

ISA UV/VIS Spectrometer

The only Site Specific Calibration UV/Vis Spectrometer System

The intelligent spectral analyser ISA provides the simultaneous acquisition of multiple parameters with only one sensor in a small form factor. This compact UV/VIS sensor provides both standard water quality parameters and additional substances and water properties applying modern chemometrical methods.

The detection is not limited to a few bands, instead the whole spectrum from ultraviolet to near-infrared (200-720nm) is detected and analysed. Solutes, suspended matter and other water properties can be characterised thoroughly. This is not limited to common values like e.g. nitrate, organic carbon (TOC) or chemical and biological oxygen demand (COD, BOD) since modern chemometrical methods are permitting the assay of various other components.

The calibration monitoring feature based on a spectral quality index (SQI) is a new technology introduced to absorption spectroscopy by Go-Systemelektronik. This allows an automatic adaptation to water matrix variances. With this there is a significant increase in measurement reliability and with this a lower risk of false alerts in water monitoring systems. Another unique feature is the possibility to quickly mechanically adjust the optical path length, without special tools.

Benefits

- One Sensor - Wide range of parameters
- Simplest calibration
- Measurement path length 0.5 - 20 mm continuously adjustable
- ATEX Category 3 [Category 2 optional]
- Ready for network based data processing and control technology [BlueGate]
- Monitoring function
- Calibration monitoring (SQI)
- Intelligent event handling
- Quality control
- Alarm systems
- Analysis of trends
- Control of water treatment
- Early detection of discharge (fingerprint)
- Process optimisation

Parameters

- Ammonium
- Biochemical oxygen demand (BOD)
- Chemical oxygen demand (COD)
- Total organic carbon (TOC)
- Dissolved organic carbon (DOC)
- Total suspended solids (TSS)
- Nitrate
- Orthophosphate
- SAC 254nm

Product Variants

The ISA UV/Vis Spectrometer is available in different variants. The ISA complete systems in combination with a BlueBox TS measuring- and control system allow for a stand-alone operation. GO Systemelektronik also offers a portable mobile version for flexible applications. The battery-powered system is designed for an autonomous operation on-site. ISA Module variants can be integrated into existing measuring systems and enable their expansion through the CAN bus interface. Depending upon the application requirements the ISA UV/Vis Spectrometer is available either as an in situ measuring head for immersion measurements or as a flow through fitting.

Functions & Features

MONITORING FUNCTION | AUTOMATED CLEANING | CALIBRATION MONITORING (SQI) | ATEX CERTIFIED | INTELLIGENT EVENT HANDLING | CLOUD DATA SERVICE | ADJUSTABLE OPTICAL PATH LENGTH | DEPLOYABLE UP TO +110 °C

Application Areas

Drinking Water
Quality control
Alarm systems

Wastewater
Influent Monitoring
Bioreactor Monitoring
Effluent Monitoring

Process Measurement & Control Technology
Process monitoring in industrial facilities
Control of process water treatment

Environmental Monitoring
River water
Surface water

Technical Specifications

System	UV/Vis spectrum 200 - 720 nm
Measuring principle	Spectral analysis
Optical measuring path length	0.5 - 20 mm
Sampling rate	≥ 3 s
Light source	Xenon pulse light

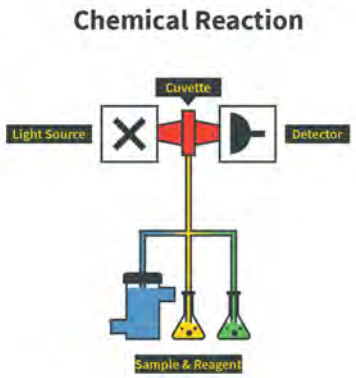
Measuring head

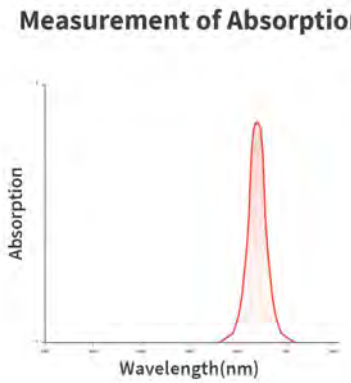
Material	Stainless steel 1.4404 / Titanium [optional]
Operation temperature range	0 °C to +110 °C
Weight	1.5 kg
Dimensions	Length approx. 230 mm; ∅ 44 mm
IP protection class	IP 68

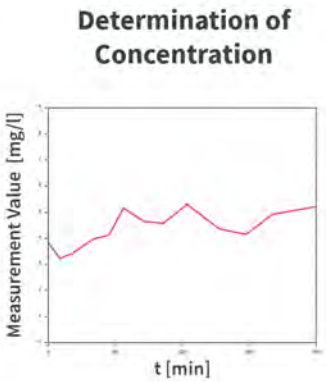
Introduction to Colorimetry

DIN Standard

If you mix water with chemicals, different effects can occur depending on the mixture. In colorimetry, these effects are used to determine a parameter. The addition of reagents causes a color change or a change in the absorption behavior of the sample. For measurement, light of a certain wavelength is radiated onto the sample and the absorption of this light is measured in transmitted light. The concentration of the substance to be measured can then be calculated directly from the absorption.

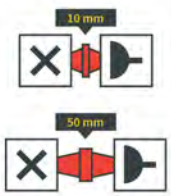






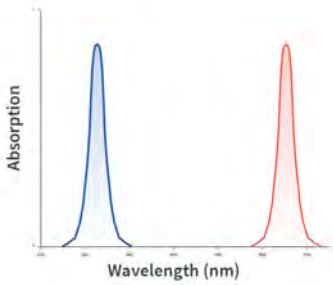
Cuvette Size

During photometric measurement, the cuvette serves as a sample container through which the light is radiated. In addition to the chemical reaction, the correct light source and the appropriate detector, the path length of the cuvette is also important. High concentrations lead to high absorption and therefore require a small path length. Low concentrations, on the other hand, require a longer path length in order to obtain ideal measurement results. By using different cuvette sizes it is possible to cover different measuring ranges.



Wavelengths

The chemical method used is parameter-specific. These differ not only in the reagents used, but also in the optical behavior of the sample after the chemical reaction. Therefore, depending on the parameter, a specific wavelength is used in the photometric measurement to determine the absorption of the sample. For example, total phosphorus is measured at 643 nm and total nitrogen at 230 nm.



Technical Data

Power supply	230 VAC (90 - 260 V)
Power consumption (typical)	42 W
Dimensions (wxhxd)	60 x 70 x 30 cm
IP protection class	IP 54 / IP 65 [optional]
Number of measuring channels	2 / up to 4 [optional]
Sample pressure	0 bar (max. 0.05 bar overpressure)
Sample temperature	+10 to +40 °C
Ambient temperature	+15 to +35 °C

Interfaces

1x RS-232, RS-485, var. protocols e.g. Modbus

1x CAN bus for connection of additional modules, sensors & actuators

1x Ethernet [TCP/IP], Modbus [TCP/IP]

Profibus [optional]

GPRS / UMTS / LTE modem [optional]

Inputs

1x Current input 4-20 mA (Example: Turbidity Sensor TU 8xxx)

4x Digital-In (static) potential-free contacts

1x Connection for pH glass electrode

1x Connection for temperature (PT1000) 0-80 °C

1x Connection for Redox/ORP electrode

1x Connection for leakage sensor

Outputs

2x Current output 4-20 mA expandable to 6x 4-20 mA

4x Digital-Out

6x Relay with a switching capacity of 24 V AC/DC; 0,5 A

Total Nitrogen

Measuring principle	spectrophotometric
Measuring range	0.0 - 6.0 / 20.0 / 100(d) mg/l
Measuring accuracy	± 5 %

Total Phosphorus

Measuring principle	spectrophotometric
Measuring range	0.0 - 2.0 / 10.0 / 100(d) mg/l
Measuring accuracy	± 3 %

Ammonium

Measuring principle	photometric
Measuring range	0.0 - 1.0 / 8.0 / 20 / 100(d) mg/l
Measuring accuracy	± 3 %

NO_3

Measuring principle	spectrophotometric
Measuring range	0.0 - 1.0 / 20.0 / 100(d) mg/l
Measuring accuracy	± 5 %

Chlorine

Measuring principle	photometric
Measuring range	0.0 - 0.2 / 1.0 / 3.0 mg/l
Art. no.	488 1FC0

Ortho-phosphate

Measuring principle	photometric
Measuring range	0.0 - 0.5 / 2.0 / 6.0 / 50(d) mg/l
Art. no.	488 1FP0

Silica

Measuring principle	photometric
Measuring range	0.0 - 0.02 / 2.0 mg/l
Art. no.	488 1FS0

Application Areas

Drinking Water

Quality control

Alarm systems

Wastewater

Trend analysis

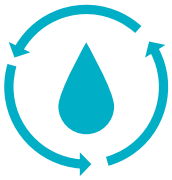
Effluent Monitoring

Process Measurement & Control Technology

Process monitoring in industrial facilities

Control of process water treatment

Process optimisation



Environmental Monitoring

River water

Surface water

Increase the revenue from your waste & sludge

Bioprocess Control offer unique instruments which also study the dynamics of the degradation process, so that you can more easily find ways to maximise digestion. Our smart testing equipment minimises workloads by turning testing into an efficient and simple routine procedure that removes the most common human errors associated with more traditional approaches.

AMPTS II

Methane potential analysis made easier

The Automatic Methane Potential Test System (AMPTS) II allows users to determine the true biochemical methane potential and dynamic degradation profile of any biomass substrate. This in turn will allow users to more easily determine the optimal retention time and mix of substrates for co-digesting, screen proper pre-treatment methods, and evaluate the need for additives.

Features & Benefits

- Determine the true bio-methane potential
- Significantly reduce your labour demands
- Standardise and compare results
- Get access to highly precise & accurate data

CSTR-5G

CSTR-10S

Gas Endeavour

Low gas volume and flow analysis

The Biogas Endeavour allows users to determine the biogas potential and dynamic degradation profile of any biomass substrate. This in turn will facilitate for users to select and price a substrate according to its true energy content of biomass, thus helping to ensure a good control of substrate economy for biogas plants.

Features & Benefits

- Determine a substrates true energy content
- Explore the potential of available substrates
- Compare your results and reports
- Take control of selecting and pricing substrates

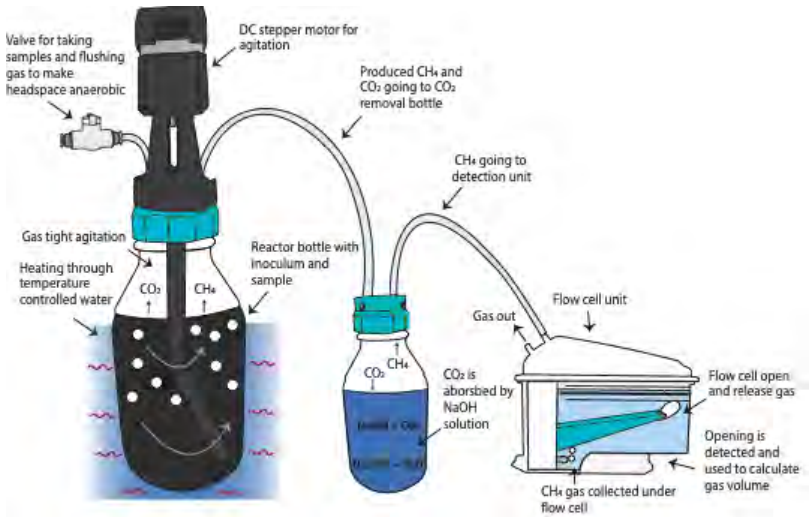
BPC® Go

Simplify and secure low gas volume and flow measurements

BPC® Go is the next-generation gas volume and flow meter containing an in-built computer to simplify and secure low gas flow measurements. It automatically measures both wet and dry gases at laboratory scale with high precision and accuracy without the need for recalibration. Built to the highest standards of Scandinavian quality, it is simple to set up and use for online, real-time monitoring from any location.

Features & Benefits

- Embedded microcontroller to secure measurements and data acquisition
- Two measurement resolutions (9 ml and 2 ml)
- Calibration free
- Large storage capacity (up to 135 000 litres of gas)
- Wide measurement range (0.2 ml to 6000 ml/h)
- View standardised results from anywhere; even on your phone or tablet
- Run both batch and continuous experiments with remote access



bugcount®
by luminultra®

Quantify total microbial activity in minutes.

Luminultra's complete portfolio of solutions give you everything you need to monitor, measure and manage microbial activity across the water cycle.

Our 2nd Generation ATP® platform, Bugcount®, delivers instant insight into total microbial load. With field-ready test kits optimized to your sample type needs and automated analysis with Relay™, teams get the real-time understanding of system health they need. It's fast, simple and proven in the environments M&E teams face daily.

luminultra®
confidence in every count

Introducing

Bugcount® One ATP Analyzer

The best-in-class ATP testing platform setting a new benchmark for microbial monitoring

Microbial activity exists in every system. Left unchecked, it can corrode infrastructure, degrade product quality and introduce operational risk. Without reliable measurement, teams lack clear visibility into what's happening in their systems. The Bugcount® analyzer makes microbial monitoring fast, simple and reliable, giving operators the insight they need to detect microbial activity early and act with confidence.
Built on Luminultra's proven ATP testing technology and paired with specialized Bugcount® test kits and Relay™ software, the platform delivers trusted microbial insight in minutes.

Better manage risk with a proactive approach

Microbial changes can have serious operational consequences. With Bugcount®, teams can detect microbial activity early and respond before problems escalate.

- Highly accurate 2nd generation ATP® technology quantifies microbial activity and tracks trends over time
- Test directly on site with results in minutes
- Make faster, more informed operational decisions

Designed for real-world environments

The Bugcount® analyzer is purpose-built for the complexity of industrial systems.

- Portable, rugged design for field or laboratory use
- Simple, intuitive interface for easy operation
- Reliable performance in demanding environments

What's included?

Your Bugcount® analyzer kit includes all the essential components for field or laboratory ATP testing, housed in a rugged hard-shell case for secure storage and transport.

Kit contents

- Bugcount® One ATP Analyzer
- Test tube rack
- USB-C charging cable and wall adapter
- Hard-shell carrying case
- Micropipettors: 100µL, 300µL, 1000µL
- User manual

Bugcount® test kits

The Bugcount® platform includes a range of test kits optimised for accurate, repeatable ATP measurements across complex real-world samples, including:

- **Water Systems**
  Cooling water, drinking water, process water, pasteurization and wastewater
- **Fuel and hydrocarbon systems**
  Fuels, brines, produced water, injection water and biofilms
- **Industrial fluids and specialty products**
  Process fluids, slurries, adhesives, paints, coatings, polymer emulsions and manufacturing fluids
- **Surface contamination monitoring**
  Solids, equipment surfaces and biofilm

Seamless data management with Relay™

The Bugcount analyzer integrates with Relay™, our industry-leading digital platform to:

- Capture and organize test results
- Monitor microbial activity across systems and sites
- Share results across teams and operations
- Turn microbial measurement into actionable operational insight

Your trusted partner in microbial management

For more than 30 years, Luminultra has helped water professionals around the world identify microbial challenges and act with confidence. From wastewater plants and distribution systems to stormwater management to drinking and source water, our tools are trusted to detect the unseen, validate the unknown, and protect the systems people rely on every day.

Our team of experts is here to help you choose the right tools and understand how to tackle your challenges head-on. Test. Identify. Act. **That's confidence in every count.**

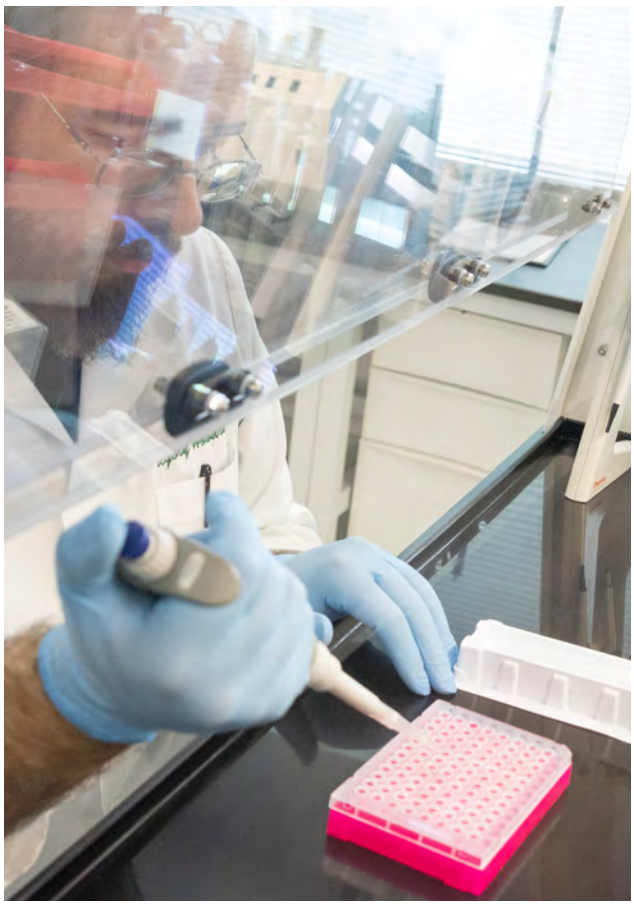
luminultra®
confidence in every count

genecount™
by luminultra®

Identify the microbes that matter

When you need total precision and clarity, Genecount® qPCR technology detects and quantifies specific microbial targets tied to operational risk, water quality and public safety.

Prefer to leave the testing to us? Luminultra Labs delivers industry-leading analysis using advanced DNA tools - including sequencing - to give you the complete picture.



labs™
by luminultra®

Our Genecount® services include

- Next Generation Sequencing (NGS): Get a comprehensive view of your microbial community to understand the bigger picture
- Microbial Source Tracking (MST): Pinpoint the source of fecal contamination
- Targeted wastewater assays: Detect key microbial groups influencing nitrification and overall system performance:
  - Total Archaea
  - Ammonia-Oxidizing Archaea (AOA)
  - Ammonia-Oxidizing Bacteria (AOB)
  - Comammox Bacteria
  - Nitrite-Oxidizing Bacteria (NOB) Group 1 & 2
  - Total Bacteria
  - Total Prokaryotes

luminultra®
confidence in every count

Faster answers. Safer systems. Better drinking water management

Problem

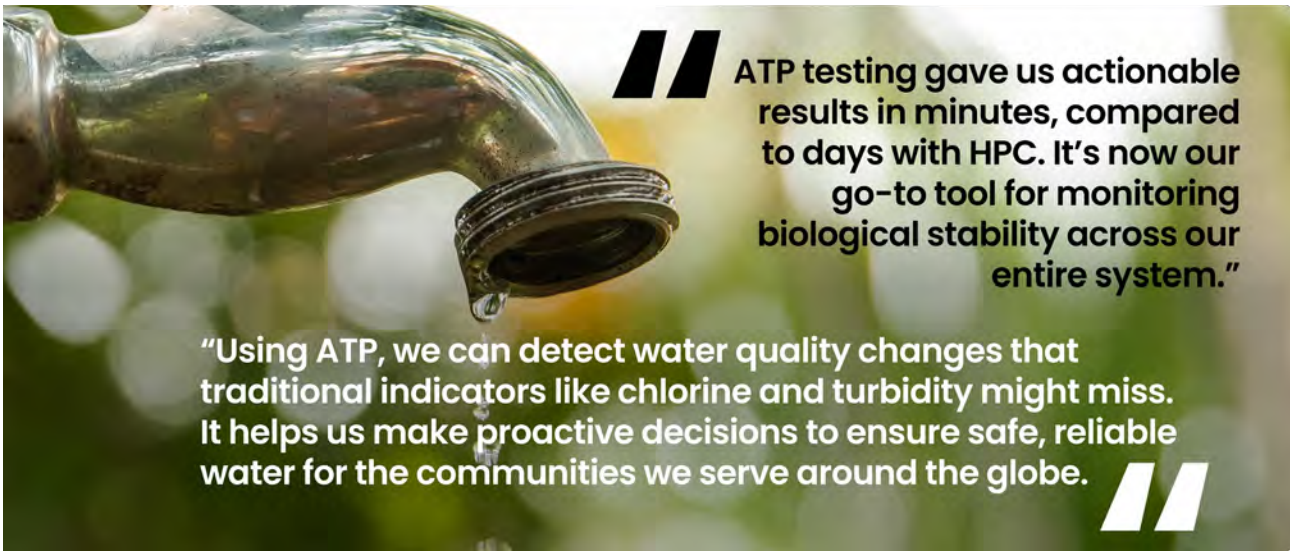
Traditional testing methods can't keep up with realworld risk. From regrowth in distribution systems to biofilm activity in storage tanks, issues escalate before they're even detected.

Solution

Our BugCount 2nd Generation ATP® technology delivers actionable insight in just minutes. Confirm disinfection success, detect hotspots and protect public confidence with real-time microbial visibility.

Applications

- Distribution system troubleshooting
- Line flushing and new installations
- Storage tank surveillance
- Taste and odour complaint resolution



luminultra®
confidence in every count

Get ahead of upsets and compliance risks in your wastewater treatment

Problem

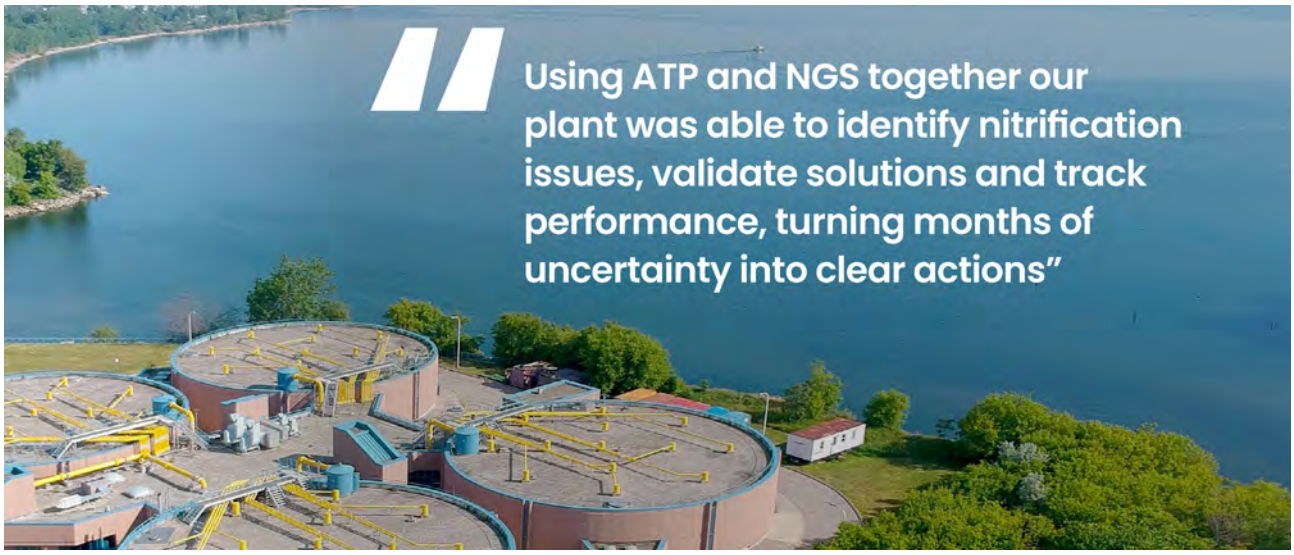
Traditional testing methods miss what really matters: accurately managing your microbial health. Operators are left blind to bulking events, nutrient imbalances, and costly inefficiencies.

Solution

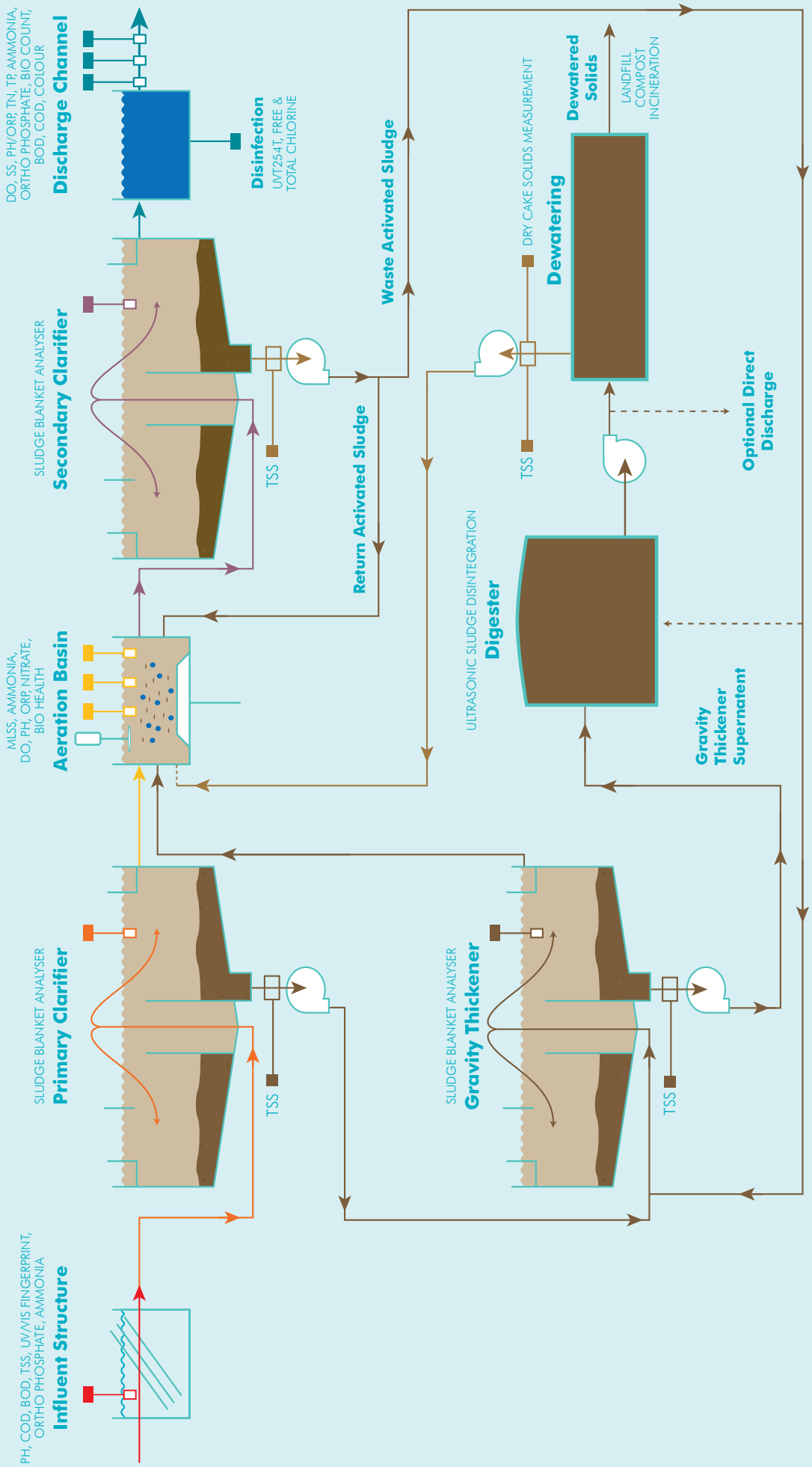
We bring clarity with real-time 2nd Generation ATP® monitoring, deeper community profiling via qPCR, and full-spectrum insight from NGS. Identify issues before they become large upsets with a fast, easy test that gives you the complete picture.

Applications

- Aeration and digestion process control
- Bulking and foaming detection
- Nitrification monitoring
- Sludge reduction and chemical optimisation



Process Control Instrumentation at a Wastewater Treatment Plant



Kuh Kai Water Aerator

Unique design creates both coarse, fine and micro-bubble aeration

KUH KAI is an innovative product that collides, stirs and breaks down sludge and air into fine particles in a pentagonal cylinder 65cm in length, to accelerate the purification of waste water. Air jetted from a pentagonal cylinder diffuses and radiates outward while eddying in a non-conventional approach.

Features

- Applicable when the water is 1m or deeper
  - Applicable to existing or new equipment as long as the water tank or lagoon pond is 1m or deeper.
- No clogging (Pentagonal tube opening 80mm × 130mm)
  - No need to worry about clogging due to the large-diameter opening particularly with intermittent processes during denitrification.
- Power cost reduction (20% to 40%)
  - With a small pressure loss between the air in-take and discharge, power costs can be substantially reduced.
- No sludge flocculation on the tank bottom and the oxygen transfer rate is high due to its “air lift effects”.
  - Sludge on the tank bottom is drawn into the pentagonal cylinder and the sludge and air are broken down into fine particles which increases the oxygen transfer rate while colliding, being stirred, and rotating. This how the KUH KAI effectively purifies the water.
- Easy maintenance and management due to its simple structure
  - The main body is made of stainless steel and the inside is made of molded resin = Virtually maintenance free. Also, the main body material and the installation method can be changed according to needs.

MIXING DEMONSTRATION IN A CLEAR WATER TANK

Whole tank volume: 170L

Sludge drawn into a cylinder rises and rotates while colliding against and being mixed with air.

Sludge stirred in the cylinder churns in a spiral and circulates in the tank for purification.

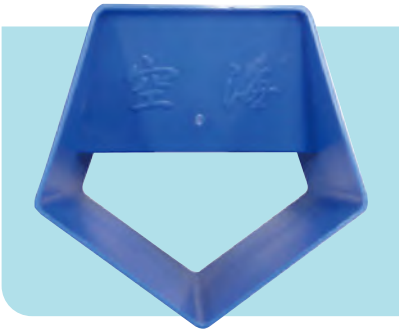
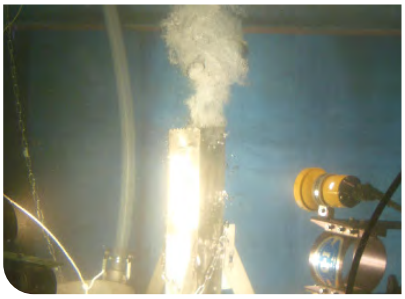


Figure 1 Petagon with collision plates



Discharge of Air

Operation in a aeration tank running condition

DEVELOPMENT

Treatment of Organic Waste using the Activated Sludge Method with micro-organisms has become a standard method in wastewater treatment. In recent years, there has been an increase in technology to reduce the footprint of Wastewater Treatment Plants whilst still maintaining and improving the efficiency of the process.

One area where there can be an improvement relates to higher efficiency of the Aerator (air diffuser). Some current systems use the bubble type generation utilizing porous materials that can clog through deposits of sludge due to the restrictions on their location and positioning. Often, a large vortex flow utilizing a large amount of energy is required to prevent this occurring.

An Aerator was required to prevent the depositing of sludge clogging the Aerator pores without using large amounts of energy. The Kuh Kai Pentagonal Air Lift Aerator was developed to fulfill this need.

EQUIPMENT DESCRIPTION

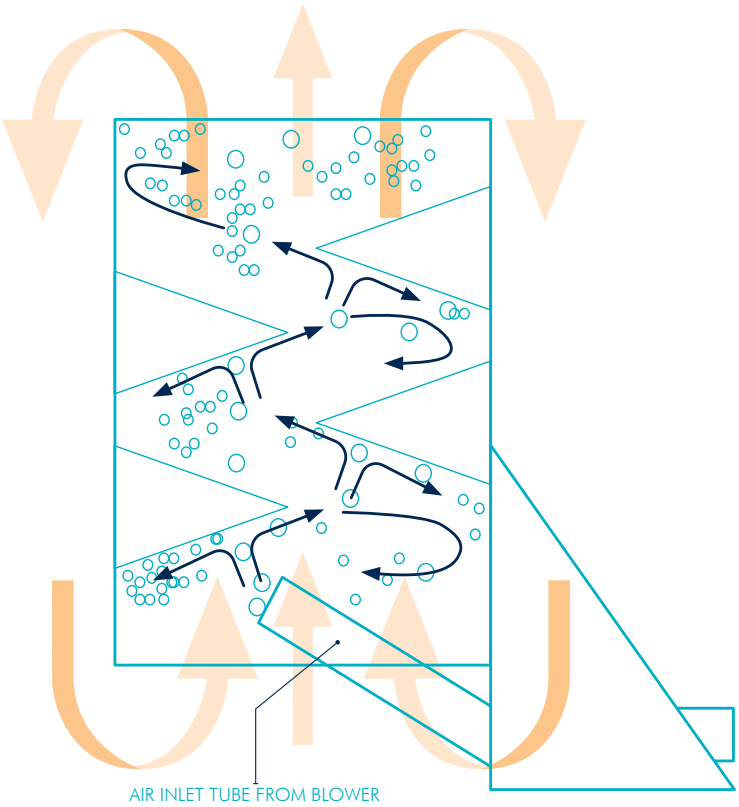
This system, in which the waste water and solids or gases are mixed, was introduced with a view to efficiently dissolve oxygen into wastewater as well as completely mixing it. A pentagon was developed whereby each pentagon section could be placed on top of one another in multiple stages in a vertical direction (**Figure 1**) with an opening impingement plate, and having a clearance between the cylindrical portion and the gas ejection nozzle with an Air inlet in a location at the bottom of the tube (**Figure 3** on the next page).

The effects of the aerator are shown in **Figure 3** and **Figure 4** (on the next page) with the discharge of actual air. It rises in the cylindrical body while colliding with the collision plate and the liquid and then forcibly discharging due to the increased pressure of the gas in the cylinder. As a result, the three parties to complete mixing - liquid, gas and solid coexist inside the cylindrical body, with the gas stage being finer due to the effects of the collision plates.

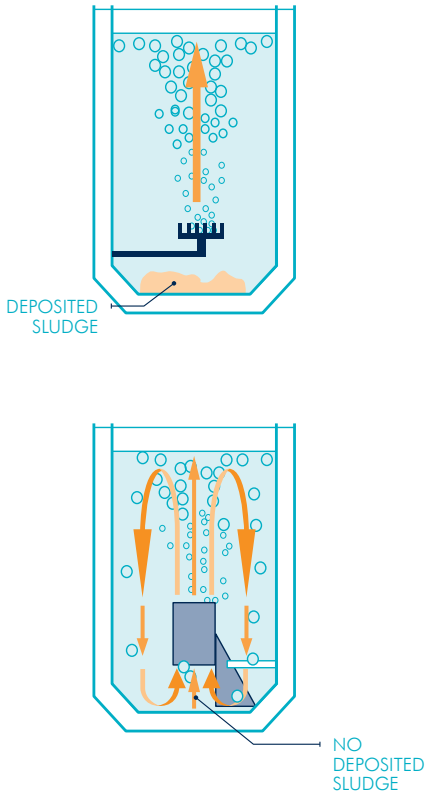
If a collision plate shown in **Figure 1** was a shape close to a circle, due to the fluid flowing along the circumference, turbulent flow in the circumferential direction would be less likely to occur. If you have polygonal shape, turbulence is likely to occur due to flow impinges on each side. On the other hand, the flow itself in the circumferential direction does not generate a large enough resistance when you use a square shape such as a triangle, and the flow would be short-circuited and only go upwards. A Pentagon has been determined as the optimum shape as a result. Moreover, from results of a study of the flow in the vertical direction for the number of stages of the impingement plate, the optimum number of stages was determined to be five stages.

SELECTION CRITERIA OF THE AERATOR IN WASTEWATER TREATMENT FACILITIES IS AS FOLLOWS:

In the aeration tank, the primary objective is the provision of adequate oxygen to activate the sludge. Design criteria is usually 2% - 17% depending on the depth, of the oxygen dissolution efficiency. The Kuh Kai aerator, is a deviation from typical design criteria due to its efficiency of oxygen and agitation capabilities as can be seen from these results. In an activated sludge aeration tank, these methods are shown in the **Figure 4** (on the next page) comparing typical porous aerator versus the Kuh Kai aerator.



Aerator Internal Gas-liquid mixing in **Figure 3**



Sludge Deposit Effects in **Figure 4**

AERATOR PERFORMANCE COMPARISON

CATEGORY	ITEM	AIR BUBBLE TYPE	MECHANICAL TYPE	KUH KAI
Oxygen transfer rate	No clogging of porous diffusers in intermittent processes during settling (denitrification)	×	✓	✓
	Complete mixing of water column of solids, liquids and air	×	×	✓
	No sludge flocculation on the tank bottom	×	×	✓
	Efficient uptake by micro-organisms by using full Biomass available	×	×	✓
Maintenance	Power saving (small pressure loss)	×	×	✓
	Facility Cost savings (easy installation and piping)	×	×	✓
	Easy Operation and Maintenance (parts replacement)	×	×	✓
	Proven Long Life Durability	×	×	✓

DATA

MODEL	MATERIAL		CONNECTION	WEIGHT	AIR SUPPLY VOLUME [M³/MIN]			COVERED AREA [M³]	ADAPTABLE WATER DEPTH [M]
	MAIN BODY	PIPING			LOWER LIMIT	SUGGESTED	UPPER LIMIT		
KA-L	Stainless steel (POM)	SUS	40A	7.2	0.4	1.1	1.5	6~12	1~
KA-M	Stainless steel (POM)	20A	20A	4.8	0.1	0.3	0.5	4~5	1~

Site Sentinel P1

High performance, industrial data logger + RTU

The P1 is the industrial-focused variant of the Site Sentinel® data logger and RTU family, providing highly-reliable, direct-to-host data monitoring in a single package.

The Site Sentinel® P1's flexible device configuration enables the measurement of a variety of analog and digital signals. This data is stored internally on non-volatile flash memory with upstream communications provided using an internal 3G or 4GX cellular modem. The cellular options provide support for tri-band 3G or 4GX option, permitting use on CAT-M1 and NB-IoT networks.

The device is housed in a low-profile, robust enclosure supporting a variety of installation options, including DIN rail compatibility and flat-panel mounting.

Additional communications ports provide DNP3.0 Slave and Modbus Master communications capability.
User configurable Modbus table permits download of pre-defined or ad-hoc Modbus data profies to support downstream devices such as flowmeters. Remote configuration and device management is supported via leading industry SCADA applications, remote firmware download capability is provided via FTP file transfer.

The P1 suits a wide range of industrial applications, such as data logging of remote sites, tank level and flow recording, pipeline cathodic protection monitoring and integration with pressure sewer pump stations.

Site Sentinel X1

Ultra low-power, flexible Cellular data logger + RTU

The X1 is the flagship variant of the Site Sentinel® data logger and RTU family, providing highly-reliable, direct-to-host data monitoring in a single package, aimed at the utility and environmental sector.

The Site Sentinel® X1's flexible device configuration enables the measurement of a variety of analog and digital signals. This data is stored internally on non-volatile flash memory with upstream communications provided using an internal 3G or 4GX cellular modem. The cellular options provide support for tri-band 3G or 4GX option, permitting use on CAT-M1 and NB-IoT networks.

Host compatibility is ensured with integrated support for DNP3.0 and FTP data protocols. Complete control is handed to the user to allow custom data reporting and wake-from-sleep regimes to be configured to balance battery life against data reporting requirements. Remote configuration and device management is supported via leading industry SCADA applications, remote firmware download capability is provided via FTP file transfer.

Additional communications port provides Modbus Master communications capability. User configurable Modbus table permits download of pre-defined or ad-hoc Modbus data profies to support 'smart' downstream devices such as flowmeters, power meters and water quality probes. The user communications port supports corrections to the XCAM-001 Image Capture Camera.

The device is housed in a low-profile, robust ABS-plastic enclosure, UV stabilised and rated at IP68, allowing for direct outdoor installation, capable of withstanding submersion to a depth of four metres for four continuous days. An in-built solar regulator battery charger is standard across many models in the X1 product range.

Biological Nutrient Reduction

At a sewage treatment plant naturally occurring micro-organisms - bacteria and protozoa - convert many of the substances found in sewage into forms that do not harm the environment. There are millions of micro-organisms of a thousand or more different species in the reactor tank.

The micro-organisms are responsible for several chemical transformations:

Heterotrophic bacteria convert molecules containing carbon into carbon dioxide and water: $CHO + O_2 \rightarrow CO_2 + H_2O$

Phosphorus accumulating bacteria have the ability to take up phosphorus.

Nitrifying bacteria turn ammonia into nitrates and water: $NH_3 + O_2 \rightarrow NO_3 + H_2O$

Denitrifying bacteria turn nitrates into nitrogen, carbon dioxide and water: $NO_3 + CHO \rightarrow N_2 + CO_2 + H_2O$

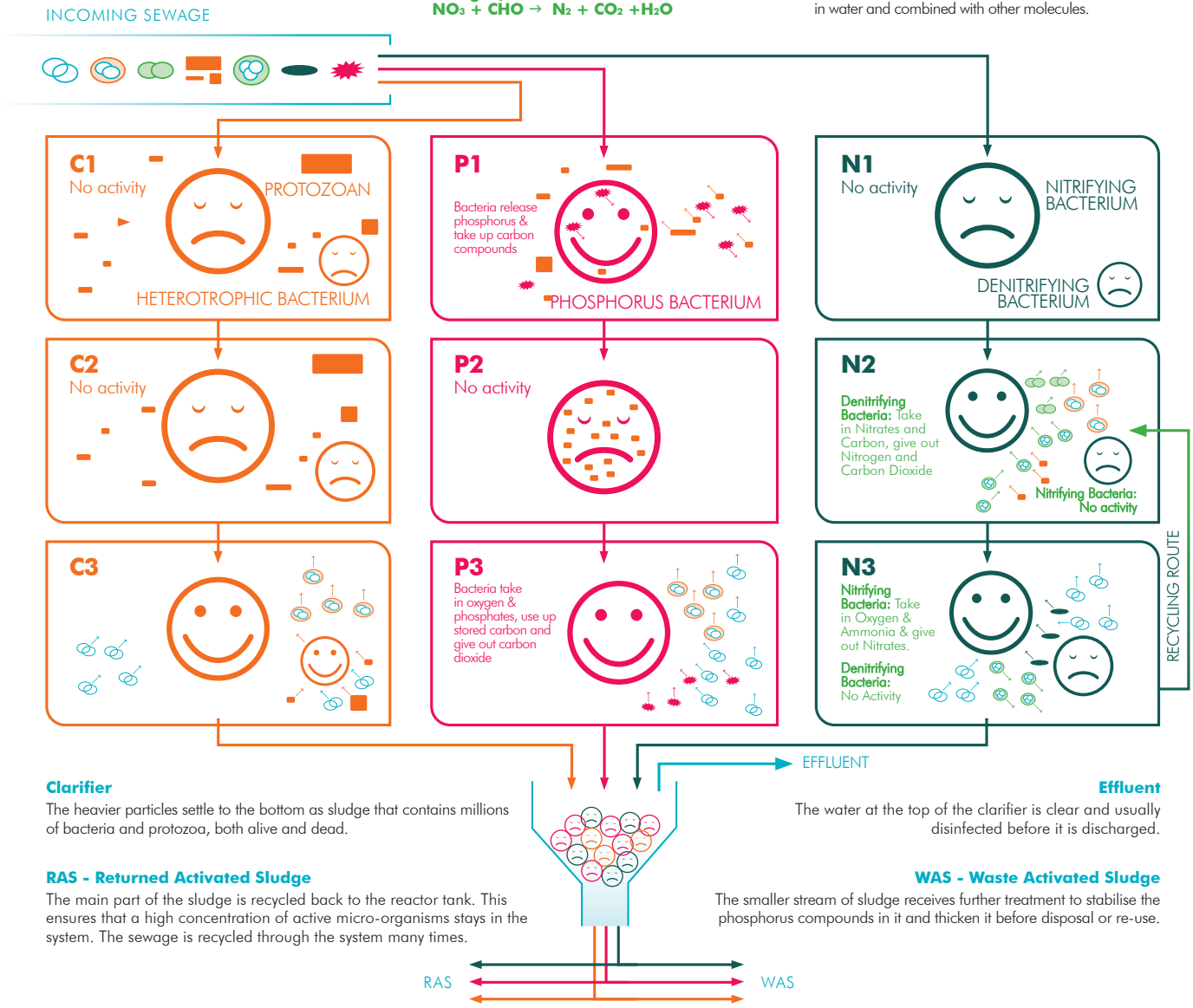
REACTOR TANK

In the reactor tank, the sewage passes through a series of zones in which different conditions are provided so as to promote the activities of the various species.

Anaerobic: No oxygen present, either dissolved in the water or combined with other molecules.

Anoxic: No oxygen dissolved in water but it is present combined with other molecules (eg. nitrate - NO_3).

Aerobic: An abundance of oxygen present, dissolved in water and combined with other molecules.



Clarifier

The heavier particles settle to the bottom as sludge that contains millions of bacteria and protozoa, both alive and dead.

Effluent

The water at the top of the clarifier is clear and usually disinfected before it is discharged.

RAS - Returned Activated Sludge

The main part of the sludge is recycled back to the reactor tank. This ensures that a high concentration of active micro-organisms stays in the system. The sewage is recycled through the system many times.

WAS - Waste Activated Sludge

The smaller stream of sludge receives further treatment to stabilise the phosphorus compounds in it and thicken it before disposal or re-use.

ZONES

Compounds containing carbon are food for heterotrophic bacteria. Bacteria, in turn, become food for protozoa. The carbon-containing compounds are converted to carbon dioxide that escapes into the air. The microorganisms need oxygen in order to be able to do this, so activity takes place only in the aerobic zone, C3.

Specialised phosphorus accumulating bacteria are responsible for depositing phosphorus compounds in the sludge. They have to have the right conditions to do this efficiently. In the anaerobic zone, P1, they are starved of oxygen but there is an abundance of small carbon containing molecules. The bacteria are stressed in these conditions. They release any phosphorus they have already absorbed and take in carbon. The bacteria pass through the anoxic zone, P2, to the aerobic zone, P3. Here they use oxygen and some of the carbon they have stored as energy, and take in lavish amounts of phosphorus. These form long chains that stick together so the bacteria become heavy and, in the clarifier, sink into the sludge, taking the phosphorus with them.

In the aerobic zone, N3, nitrifying bacteria use oxygen and nitrogen containing molecules as a source of energy to convert the ammonia form of nitrogen into nitrates. This process is called `nitrification'. In the anoxic zone, N2, denitrifying bacteria take in carbon compounds and use nitrates as a source of oxygen. The nitrates are broken down to form nitrogen gas and carbon dioxide. The gases escape into the air. Neither the nitrifying nor the denitrifying bacteria are active in the anaerobic zone, N1.

KEY

Different species of micro-Organisms require specific conditions for growth.

'Animated' having suitable conditions for growth.

Sleepy' awaiting favourable conditions.

The chemicals involved are:

Oxygen O_2

Carbon Dioxide CO_2

Nitrogen gas N_2

Compounds containing nitrogen as nitrate NO3

Compounds containing carbon (CHO), some large and complex, others small and simple

Compounds containing phosphorus mostly as phosphate (PO4)

Compounds containing nitrogen in the ammonia form (NH3)

10/2026

ACKNOWLEDGEMENTS: Peter Griffiths, Dr. Helen Stratton & Jenifer Simpson

Royce Water Technologies Pty Limited
Policy Summary

Inclusion and Diversity

At Royce Water Technologies, we believe in and are committed to Inclusion and Diversity. We value each individual's unique capabilities, backgrounds and values. We rely on these diverse perspectives to drive our Innovation and Teamwork, to deliver the best outcomes for our Company in facing the challenges of the future. We strive to create an inclusive environment with equality of opportunity regardless of people's gender, age, cultural background, religion, sexual orientation, gender identity, disability or family status.

Cultural Heritage and Beliefs

Royce Water Technologies operates within the traditional country of the Guringai peoples. We recognise and deeply value their cultural heritage and beliefs and, in particular, their custodianship of the land that is now Banyo, for more than 40,000 years.

Sustainability

At Royce Water Technologies, Sustainability is central to our business. We support sustainable outcomes not only for the Company but also for our Clients and the local Communities in which we operate. We reduce our Environmental impact through careful Supplier resourcing as well as Innovative manufacturing processes. Routine monitoring of these operations ensures improved sustainability business practises.

Modern Slavery

Royce Water Technologies respects human rights and is committed to limiting the risk of modern slavery within our supply chains and operations. The Company does not condone or use child or forced labour in any of our operations or premises and will work to ensure these practices are not present in our operations or supply chain. We expect that all organisations we engage with to do the same. We declare that our workforce is voluntarily and entitled to leave the work whenever they desire. Workers are not required to post a deposit or bond, and salaries are not withheld for any reason. The Company will follow all laws and regulations regarding employment practices and if made aware of modern slavery practices in its own business, or within its supply chain, will resolve the issue in line with the values expressed in this policy. It is expected that suppliers have similar values to the Company concerning modern slavery.

Quality
ISO 9001: 2015

Royce Water Technologies is committed to promoting the use of a process-based approach to quality management and that decisions made within the company are considered using risk-based thinking. Royce Water Technologies will ensure that the effective mix of resources is made available to achieve the outputs required against our customers' requirements. We are committed to the identification, evaluation, reporting of non-conformances, management review and communication to all workers to ensure quality objectives are met, and procedures are effective in promoting continual improvement.

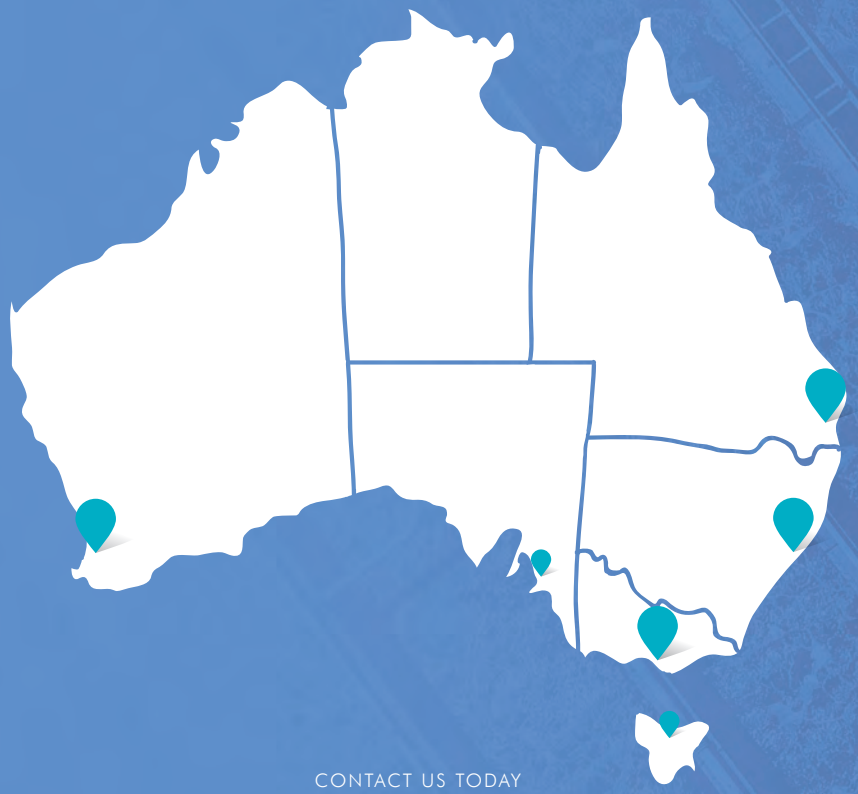
OH&S
ISO 45001: 2018

Royce Water Technologies is committed to the prevention of work-related injury and ill health of its staff, contractors and visitors within its working environment. It is our policy to ensure that any work carried out within the scope of the business is conducted in compliance with our OH & S System and complies with all applicable regulatory requirements. Emphasis will be placed on effective management ensuring a systematic approach to the identification of risks using a hierarchy of controls and, the allocation of financial and physical resources to control these risks.

Environmental
ISO 14001:2015

Royce Water Technologies is committed to managing the environmental impact of our business processes. It is our policy to ensure that any work carried out within the scope of the business is conducted in an environmentally aware and responsible manner and complies with all applicable regulatory requirements. This commitment extends to ensuring that operations do not unnecessarily endanger flora, fauna, sensitive areas, sites of heritage importance or present concerns to members of the public and community.

Royce Water Technologies is a proud Australian manufacturer and supplier to our diverse water and wastewater market.



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